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N JUAN BASIN ACTION PLAN

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PROPOSED WILDERNESS AREAS ENVIRONMENTAL IMPACT STATEMENT

US DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE

1982

NOTICE

This document is the Draft Environmental Impact Statement (EIS) for the BLM's Bisti, De-na-zin, and Ah-shi-sle-pah Proposed Wilderness Areas. This EIS should be used in conjunction with the Cumulative Overview, which analyzes the cumulatively significant impacts of the following separate but interrelated proposals in the San Juan Basin of northwestern New Mexico. These proposals are all part of the BLM's San Juan Basin Action Plan.

Coal Preference Right Leasing;
San Juan River Regional Coal Leasing;
Bisti, De-na-zin, and Ah-shi-sle-pah Wilderness Study Areas;
Ute Mountain Land Exchange;
New Mexico Generating Station; and
Bisti Coal Lease Exchange.

The effects of the end uses of the Ute Mountain Exchange are also addressed in the New Mexico Generating Station Environmental Impact Statement. The effects of the Coal Preference Right Lease Applications are also addressed in the San Juan River Regional Coal Leasing Environmental Impact Statement.

The Draft EIS and Draft Cumulative Overview should be retained to be used in conjunction with the Final EIS and Final Cumulative Overview. The final documents may incorporate the drafts by reference and include modifications and corrections that are made as a result of public comment, as well as a record of the public comments and the responses to them.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
3550 Pan American Freeway, N.E.
P.O. Box 6770
Albuquerque, New Mexico 87107

IN REPLY REFER TO
1792 (015)

NOV 30 1982

Dear Sir or Madam:

This Draft Bisti, De-na-zin, Ah-shi-sle-pah Proposed Wilderness Areas Environmental Impact Statement has been developed by the BLM Albuquerque District Office in accordance with the Council on Environmental Quality's regulations implementing the National Environmental Policy Act (40 CFR 1500-1508).

The public review period on this document will close at 4:30 p.m. on February 7, 1983. You are invited to comment on the adequacy of the draft, and may discuss it during the following informal open houses.

Farmington, December 14, 1982 from 3 to 9 p.m.
Civic Center
212 West Arrington
Exhibit Hall 1

Albuquerque, December 14, 1982, 3 to 9 p.m.
Convention Center
Isleta-Jemez Room
401 Second N.W.

Crownpoint, December 15, 1982, 3 to 9 p.m.
Navajo Chapter House

Gallup, December 16, 1982, 3 to 9 p.m.
Holiday Inn Meeting Room
Highway 66 West

Taos, December 16, 1982, 3 to 9 p.m.
Kachina Lodge
Cabaret Room
North Pueblo Road

Formal public hearings are scheduled for the following locations where you may make oral comments.

Crownpoint, January 10, 1983 starting 1 p.m.
Navajo Chapter House

Farmington, January 12, 1983 starting 9 a.m. and 7 p.m.
Civic Center
212 West Arrington
Exhibit Hall 1

Albuquerque, January 14, 1983 starting 9 a.m. and 7 p.m.
Four Seasons Motel
2500 Carlisle Blvd., N.E.

A specific time to testify should be reserved by contacting the BLM New Mexico State Office, P.O. Box 1449, Santa Fe, New Mexico 87501, (505) 988-6316.

Written comments are encouraged even if an oral presentation is made. A comment sheet is enclosed for this purpose. This sheet should be sent or submitted in person to:

State Director (912)
Bureau of Land Management
New Mexico State Office
P.O. Box 1449
Santa Fe, New Mexico 87501

Comments must be received by the close of business (4:30 p.m.) on February 7, 1983 in order to be considered in the preparation of the final environmental impact statement. Responses to oral and written comments addressing the adequacy of the statement will be included in the final document.

I look forward to receiving your comments, and thank you for your interest and participation.

Sincerely yours,

L. Paul Applegate

L. Paul Applegate
District Manager

Enclosures (2)
1-Comment Sheet
2-Draft EIS

SAN JUAN BASIN ACTION PLAN
COMMENT SHEET
BISTI, DE-NA-ZIN, AH-SHI-SLE-PAH PROPOSED WILDERNESS AREAS EIS

Comments on this Draft EIS will be accepted through February 7, 1983 by:

State Director (912)
Bureau of Land Management
New Mexico State Office
P.O. Box 1449
Santa Fe, NM 87501

Please sign and date this sheet.

(Add continuation sheets as necessary.)

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DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DRAFT
ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED BISTI, DE-NA-ZIN, AH-SHI-SLE-PAH WILDERNESS AREAS
SAN JUAN COUNTY, NEW MEXICO

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Abstract: The Bureau of Land Management proposes to recommend the approximately 3,968-acre Bisti Wilderness Study Area and the approximately 19,922-acre De-na-zin Wilderness Study Area for inclusion in the National Wilderness Preservation System, and to designate the approximately 6,563-acre Ah-shi-sle-pah Wilderness Study Area as non-wilderness. Implementation of the Proposed Action would result in increased backcountry visitor use, prohibition of unauthorized vehicle use, and provide for greater protection of cultural and paleontological resources on the Bisti and De-na-zin WSAs. Implementation would also result in surface disturbance associated with the development of energy resources on the Ah-shi-sle-pah WSA.

Type of Action: ( ) Administrative (x) Legislative

Contact for this DEIS: Richard Fagan
Bureau of Land Management
Albuquerque District Office
P.O. Box 6770
Albuquerque, New Mexico 87107
Commercial Number: (505) 766-2455
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Charles W. Luscher,
BLM New Mexico State Director

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Date Filed with EPA: Draft: NOV 30 1982
Final:

Dates of Comment and Review Period: NOV 30 1982 FEB 07 1983

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BISTI, DE-NA-ZIN, AH-SHI-SLE-PAH
PROPOSED WILDERNESS AREAS
ENVIRONMENTAL IMPACT STATEMENT

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SUMMARY

SUMMARY

PROPOSED ACTION AND ALTERNATIVES

The BLM proposes the designation of the approximately 3,968-acre Bisti WSA and the approximately 19,922-acre De-na-zin WSA as wilderness. The BLM also proposes that the approximately 6,563-acre Ah-shi-sle-pah WSA be designated as non-wilderness.

Three alternatives to this Proposed Action are also analyzed. These alternatives are shown with the Proposed Action in the matrix below. The No Action Alternative analyzes Area of Critical Environmental Concern (ACEC) designation for the Bisti and De-na-zin WSAs. Alternative 1 is the wilderness designation of 10,684 acres of the De-na-zin WSA. Wilderness designation of the Ah-shi-sle-pah WSA is considered under Alternative 2.

	Bisti WSA	De-na-zin WSA	Ah-shi-sle-pah WSA
Proposed Action	Wilderness	Wilderness	Non-Wilderness (No Special Designation)
No Action Alternative	Non-Wilderness (ACEC)	Non-Wilderness (ACEC)	*
Alternative 1	*	Partial Wilderness	*
Alternative 2	*	*	Wilderness

*Indicates designation category the same as the Proposed Action for that WSA.

Partial wilderness designation of either the Bisti or the Ah-shi-sle-pah WSA is not considered to be a reasonable alternative because size, location and activities on adjacent lands would make either WSA unmanageable.

AFFECTED ENVIRONMENT

The Bisti, De-na-zin, and Ah-shi-sle-pah Wilderness Study Areas (WSAs) are in northwestern New Mexico, south of the city of Farmington in the San Juan Basin. The San Juan Basin is the center of intense interest in the development of energy resources.

Within the general badlands and rolling terrain of the WSAs, certain areas are recognized for their special features. Mushroom-shaped rock formations, pinnacles and spires shaped by erosive forces create a "moonscape" appearance. In addition to the geologic formations, exposed petrified logs and stumps and the remains of prehistoric animals are common. The scientifically valuable remains of vertebrates, invertebrates, and plants have given the area international prominence for paleontological study.

Recoverable surface and underground coal underlies the WSAs, ranging in depth from just under the surface to over 500 feet. A number of oil- and gas-producing formations also underlie the general area of the WSAs, but at a greater depth than the coal beds. Scattered uranium deposits have been found underlying the WSAs.

Non-mineral-related activities in the area include dispersed recreation (sightseeing, collecting, hiking, and photography), livestock grazing, and use by local Navajo Indians for religious and ceremonial purposes. Archeological sites have been found, and Navajo gravesites are also believed to exist in the WSAs.

The sandstone- and shale-derived soils of the WSAs support little vegetation; some sagebrush, pinyon-juniper, and grass are found. These vegetation habitats provide a niche for such wildlife species as coyotes, jackrabbits, cottontail rabbits, deer mice, scaled quail, mourning dove, some passerine songbirds, snakes, and lizards. All three WSAs provide nesting habitat for raptor species of high interest, including ferruginous hawks, golden eagles, and prairie falcons.

ENVIRONMENTAL CONSEQUENCES

Proposed Action

Under wilderness designation, wilderness values and archeological sites in the Bisti and De-na-zin WSAs would be preserved. Implementation of a management plan would enhance recreational values and maintain paleontological and visual values.

Wilderness designation of the Bisti WSA would result in an increase in recreation use values from the present level of $6,142 per year (conservatively) to $41,369 per year by the year 2000. On the De-na-zin WSA, these values would increase from $30,822 annually to $207,416 per year by the year 2000.

On the De-na-zin WSA, restrictions on subsidence could reduce the amount of recoverable coal from 200 to 140 million tons. The 60 million tons of coal not mined has an estimated value of $1.32 billion, which would be lost to the economy.

The Proposed Action would place the Ah-shi-sle-pah WSA under no special designation, opening the WSA to the surface mining of 270 million tons of coal worth $5.94 billion. This activity is expected to disturb or destroy many of the resources in the WSA. After mine reclamation took place, some vegetation, wildlife, livestock grazing, and recreation would be restored. However, other resources such as archeological sites, paleontological remains, and wilderness preservation values would be lost.

Alternatives to the Proposed Action

No Action Alternative

Under this alternative, ACEC designation of the Bisti and De-na-zin WSAs would protect or enhance recreation and visual, paleontological, and archeological resource values. Development in some areas of the De-an-zin WSA, however, would impact resources such as soils, vegetation, and wildlife. The increase in dollar values associated with recreation use would be less than under the Proposed Action, and some wilderness preservation values would be lost.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

The significant impacts associated with the partial wilderness designation of the De-na-zin WSA would be the same as those of the Proposed Action for De-na-zin. However, only 10,684 acres would be involved.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

The significant impacts associated with designating the Ah-shi-sle-pah WSA as wilderness would be similar to those of the Proposed Action for the Bisti and De-na-zin WSAs. Strippable coal reserves with a gross value of $5.94 billion would not be mined under this alternative.

CHAPTER 1

PROPOSED ACTION AND ALTERNATIVES

CHAPTER 1

PROPOSED ACTION AND ALTERNATIVES

HISTORY AND BACKGROUND

The Bisti, De-na-zin, and Ah-shi-sle-pah Wilderness Study Areas (WSAs) are in northwestern New Mexico, south of the city of Farmington in the San Juan Basin (refer to Map A). The San Juan Basin is the center of intense interest in the development of energy resources.

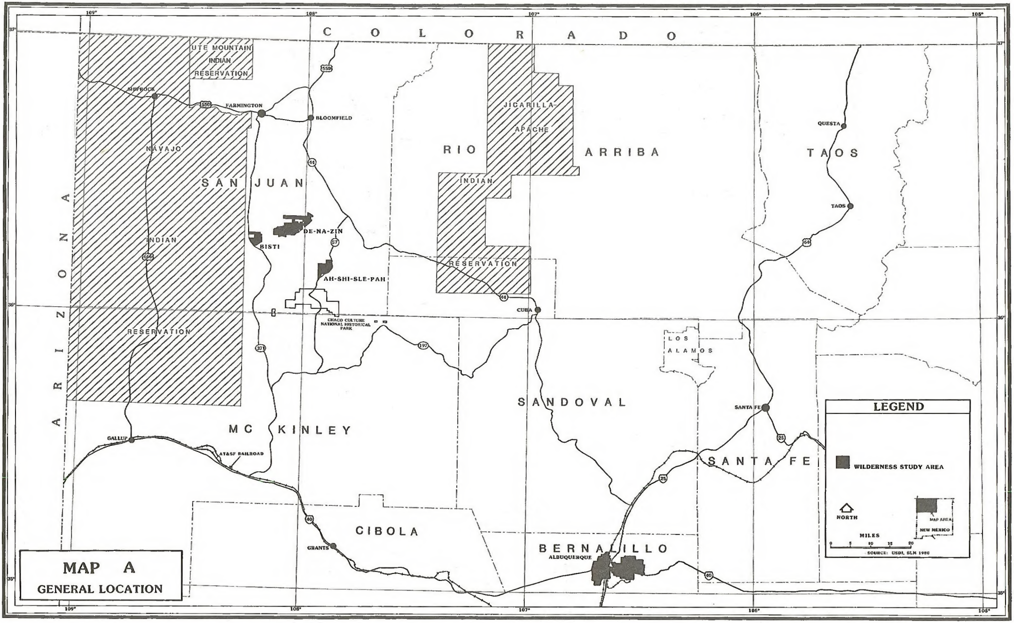
For years, portions of the WSAs have been recognized for their special features. Mushroom-shaped rock formations, pinnacles and spires shaped by erosive forces create a "moonscape" appearance. In addition to the geologic formations, exposed petrified logs and stumps and the remains of prehistoric animals are common. The scientifically valuable remains of vertebrates, invertebrates, and plants have given the area international prominence for paleontological study. The scenic, scientific, recreational and wilderness values form the basis for the recommendation for designation of these areas as Wilderness Study Areas. (Refer to Appendices A, B and C for further description of the WSAs' wilderness characteristics and special features.)

On November 28, 1979, the Bureau of Land Management's (BLM's) State Director formally announced his final wilderness inventory decision identifying the Bisti, De-na-zin and Ah-shi-sle-pah as WSAs. (Refer to Map B for the areal extent of the WSAs.) Preliminary wilderness suitability and nonsuitability recommendations for these WSAs were made when the State Director approved the Albuquerque District Manager's decisions in the Chaco Planning Unit Management Framework Plan (MFP) in September, 1981. This MFP forms the background for the Proposed Action and alternatives analyzed in this EIS.

PURPOSE AND NEED

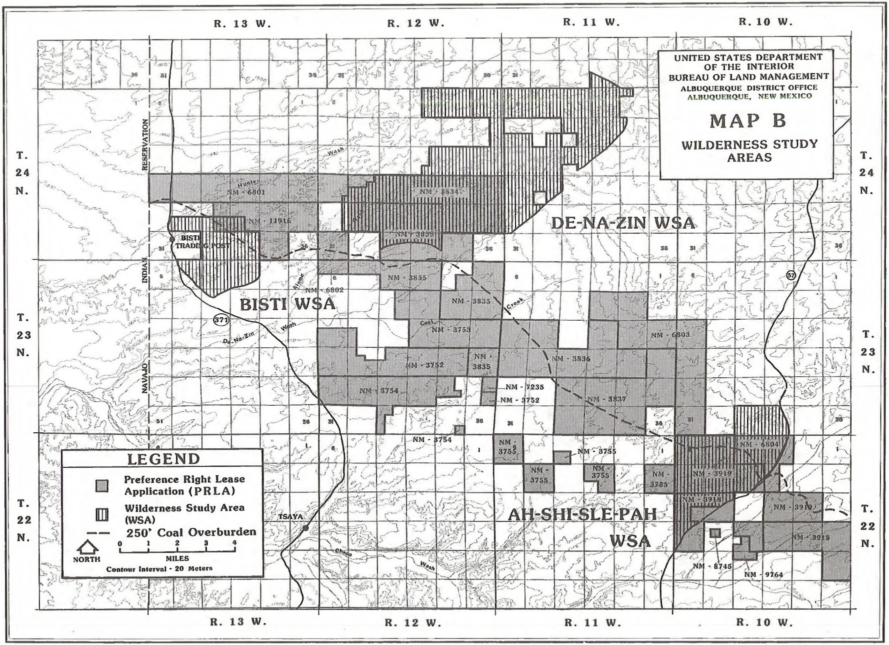
The Federal Land Policy and Management Act (FLPMA) was enacted on October 22, 1976. This law designates the BLM as a full participant in the National Wilderness Preservation System, which was created by the Wilderness Act of 1964. FLPMA mandates the Secretary of the Interior to direct the BLM to study all public lands under its jurisdiction for possible wilderness designation by Congress. The results of these studies, along with the wilderness suitability recommendations and other documents, are transmitted from the Secretary of the Interior to the President, who submits this material to Congress. The final decision whether or not to designate wilderness is made by Congress.

This EIS is an individual BLM-initiated analysis in the Farmington Resource Area of the Albuquerque District Office. The Proposed Action is in response to Sections 302 and 603 of FLPMA and to the planning recommendations from the Chaco MFP (USDI, BLM 1981d). The need for the analysis in this EIS is to provide BLM managers and congressional decisionmakers with an evaluation of the quality of wilderness values present in these WSAs. In addition, this EIS analyzes the impacts of designating the Bisti, De-na-zin, and Ah-shi-sle-pah WSAs as wilderness or non-wilderness.



MAP A

GENERAL LOCATION



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OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

MAP B

WILDERNESS STUDY AREAS

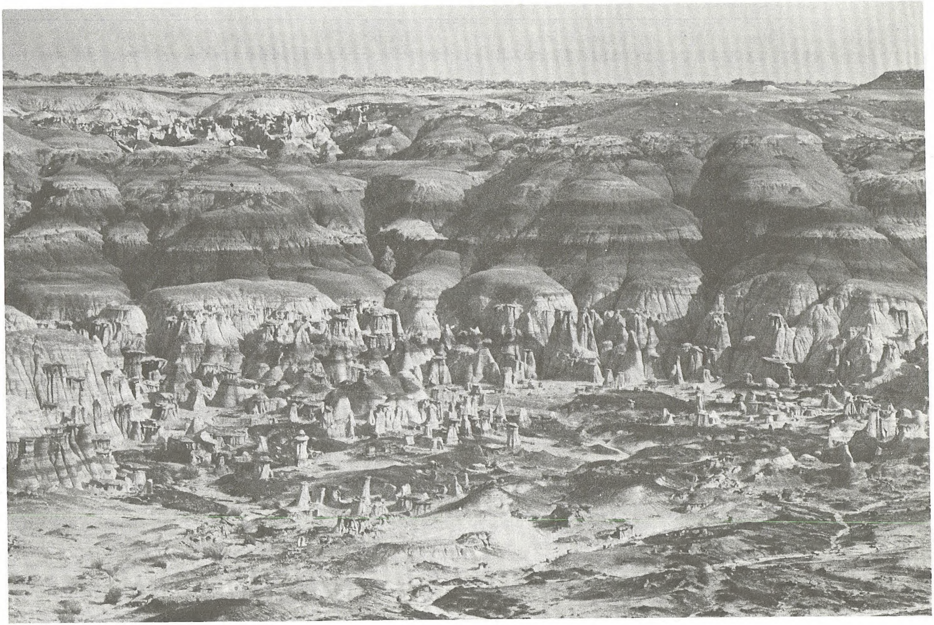


Figure 1-1 Looking from northwest to southeast within the Bisti WSA. This view shows the topographic transition from a wash to eroded sandstone formations ("hoodoos"), billowy mounds of siltstone, and pockets of hoodoos rising to the flatlands.

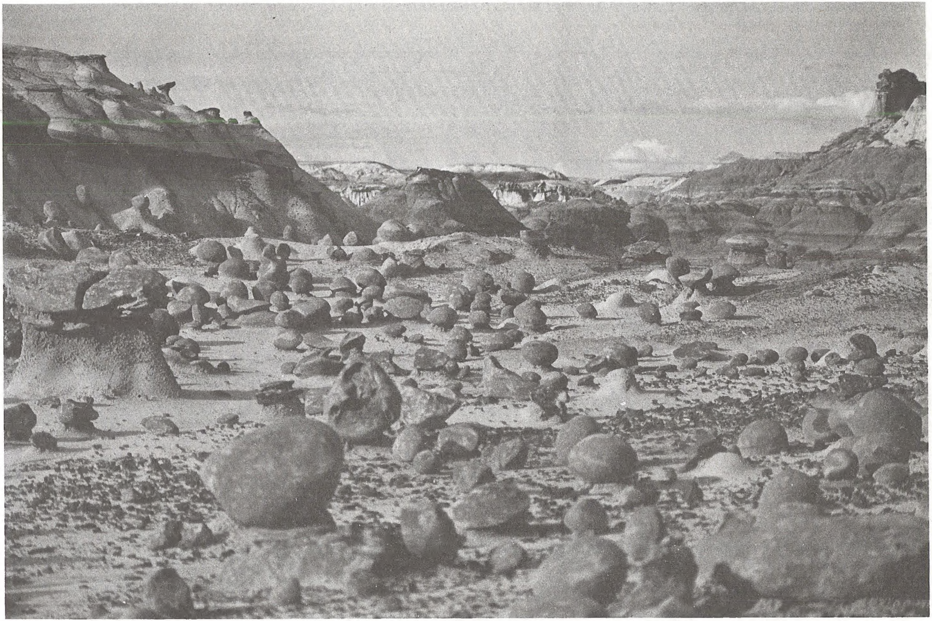


Figure 1-2 Bisti WSA "bowling alley" of weathered sandstone.

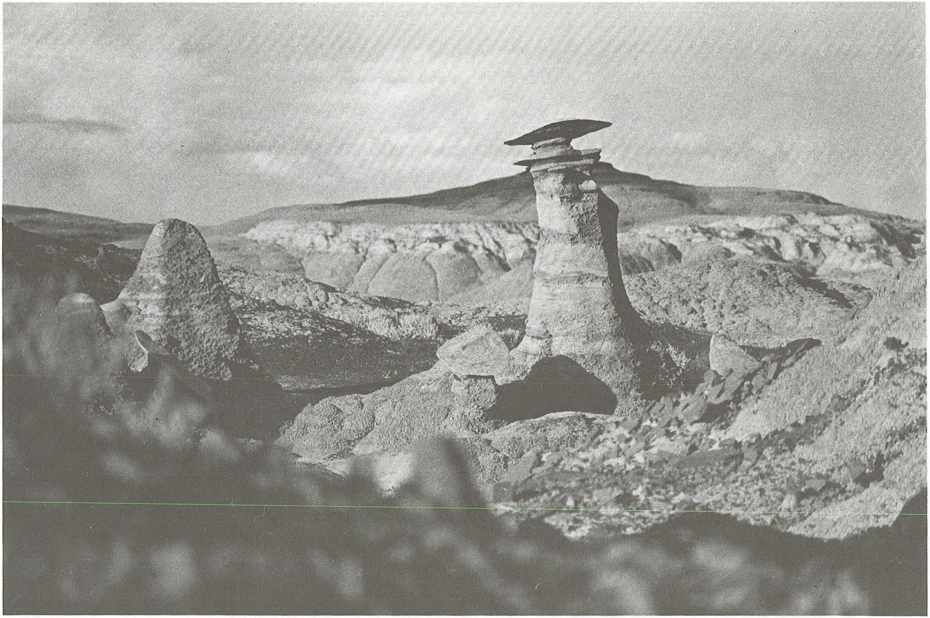


Figure 1-3 Typical Bisti WSA erosion-produced scenery — a shale-capped sandstone tower.

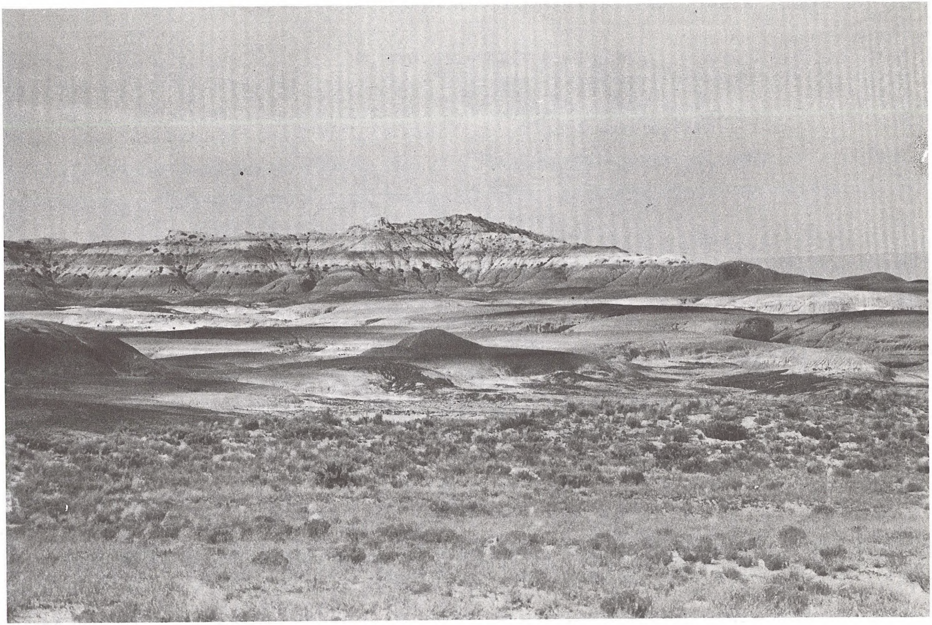


Figure 1-4 View of bluffs in the northwest part of the De-na-zin WSA near Hunter's Wash.

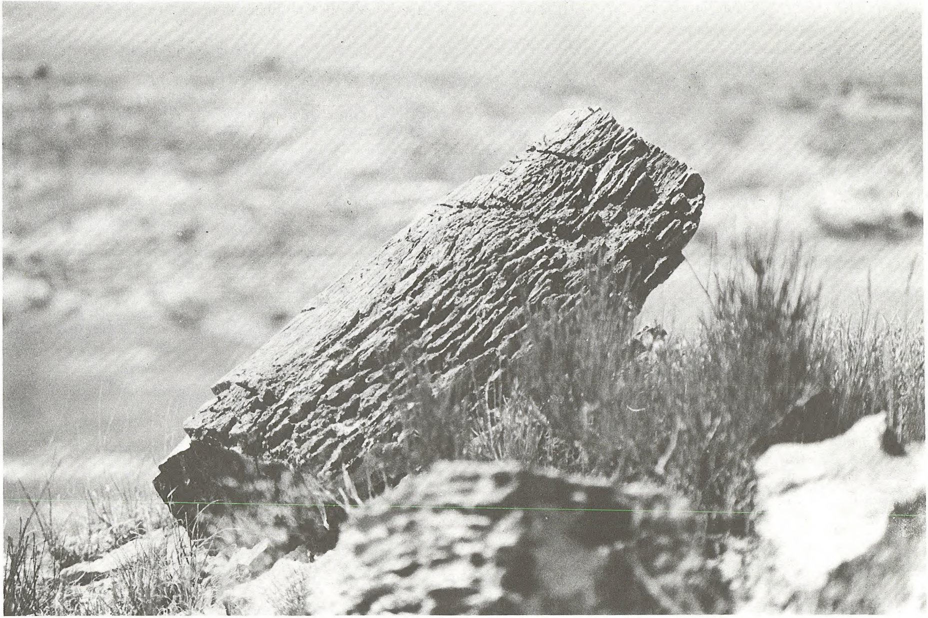


Figure 1-5 A special feature of the De-na-zin WSA: fossil log (approximate length=4 feet).

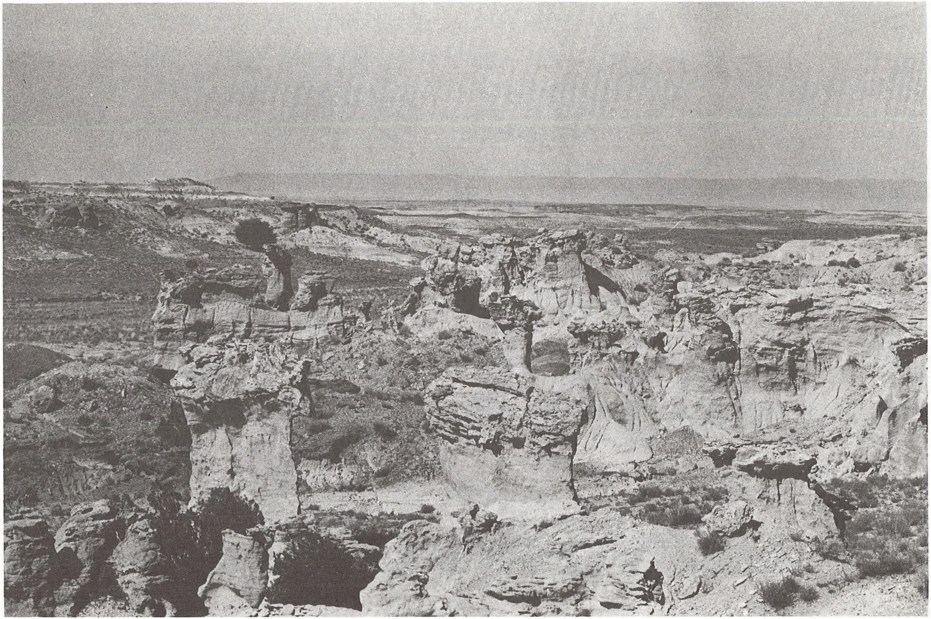


Figure 1-6 The rugged topography of the De-na-zin WSA, as viewed in a westward direction towards the Chuska Mountains.

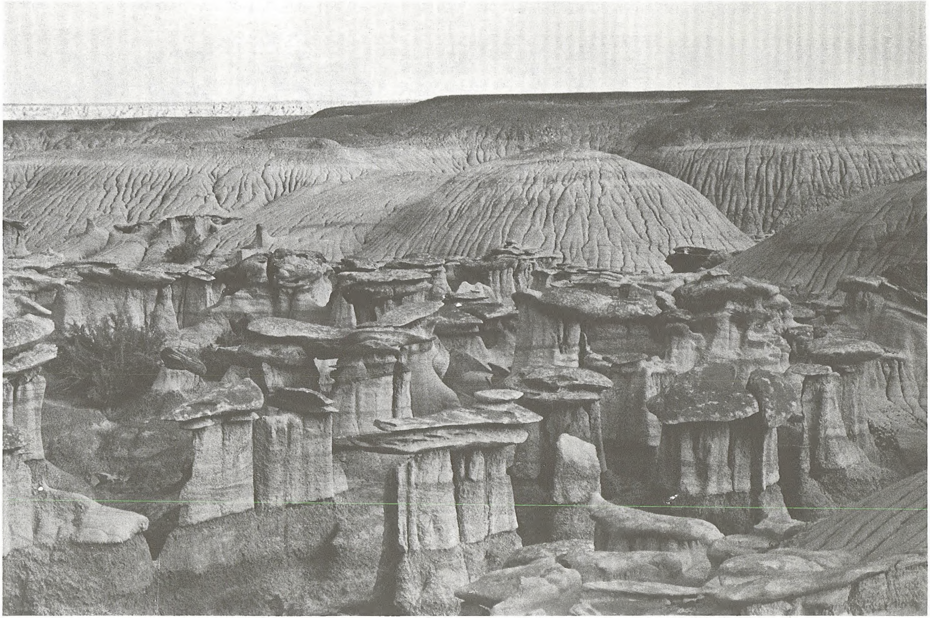


Figure 1-7 Shale-capped sandstone "mushrooms" and hills of siltstone in the Ah-shi-sle-pah WSA (southeast portion).

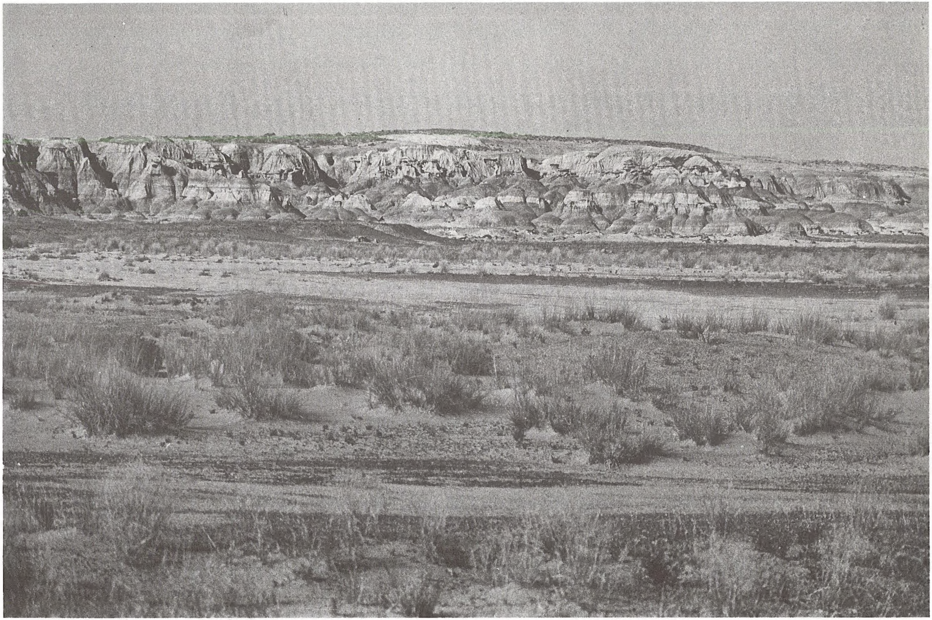


Figure 1-8 Within the Ah-shi-sle-pah WSA, looking south across Ah-shi-sle-pah Wash towards sandstone/shale eroded formations.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Introduction

The designations considered for each WSA by alternative are displayed in the matrix below. It shows the Proposed Action and reasonable alternatives.

	Bisti WSA	De-na-zin WSA	Ah-shi-sle-pah WSA
Proposed Action	Wilderness	Wilderness	Non-Wilderness (No Special Designation)
No Action Alternative	Non-Wilderness (ACEC)	Non-Wilderness (ACEC)	*
Alternative 1	*	Partial Wilderness	*
Alternative 2	*	*	Wilderness

*Indicates designation category the same as the Proposed Action for that WSA.

Proposed Action

The BLM is proposing to recommend that (1) the approximately 3,968-acre Bisti WSA (NM-010-057) and the approximately 19,922-acre De-na-zin WSA (NM-010-04) be designated as Wilderness Areas; and (2) the approximately 6,563-acre Ah-shi-sle-pah WSA (NM-010-09) receive a non-wilderness designation. This Proposed Action is a result of decisions made in the Chaco MFP, and applies only to the acreage within the WSA boundaries.

Wilderness Analysis Reports

The criteria and standards for the wilderness suitability of each WSA were considered in the Chaco MFP. In the MFP, the narrative presented for these criteria and standards assumes that this Wilderness EIS will generate additional data and provide further analysis. Therefore, more detailed Wilderness Analysis Reports accompany and are part of this EIS (refer to Appendices A, B, and C).

No Action Alternative

The Chaco MFP included the decision to designate the Bisti and De-na-zin WSAs as an Area of Critical Environmental Concern (ACEC). The purpose of ACEC designation is to provide special management for the outstanding recreational, paleontological, wilderness, and visual resource values. These values were inventoried in the preparation of the MFP. (For additional information on them, refer to Appendices A through C. Further information is also available for review at the BLM Farmington Resource Area Office.)

ACEC designation is a BLM decision subject to the constraints and procedural requirements of the BLM planning system. This designation is an administrative decision that does not guarantee protection as permanent or long-term as a Congressionally sanctioned or legislative designation such as wilderness. The difference in the relative permanence of the designations is not discussed further in this EIS.

Under this alternative, the Ah-shi-sle-pah WSA would be placed under no special designation, as it would be under the Proposed Action. The impacts of this designation are described under the Proposed Action in Chapter 3.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

This alternative was developed and analyzed to eliminate several existing and potential land status issues that occur within the boundaries of the present De-na-zin WSA. These issues affect lands with split estate (federal surface/state minerals) and Indian occupancies, and lands involved in the Navajo Land Exchange and the Navajo-Hopi Land Settlement Act. They are further discussed in the Wilderness Analysis Report for the De-na-zin WSA (Appendix B of this EIS). Approximately 10,684 acres lying primarily in the south-central portion of the existing WSA (refer to Map C) are included in Alternative 1. It should be noted that the boundaries of the partial De-na-zin WSA as analyzed in this alternative could be modified at a later date prior to the alternative being selected by Congress.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Although it was recommended in the Chaco Planning Unit MFP that the Ah-shi-sle-pah WSA not receive any special management designation, the final wilderness suitability decision has not been made and can only be made by Congress. This alternative analyzes the impacts on the resources in this WSA if the decision was made to designate the Ah-shi-sle-pah WSA as a wilderness area.

ALTERNATIVES NOT ANALYZED IN THIS EIS

Partial designation of either the Bisti or the Ah-shi-sle-pah WSA is not analyzed in this EIS because it is not considered to be a reasonable alternative to the Proposed Action (refer to Appendices A and C for a discussion of these WSA's manageability). Partial designation of the Bisti or Ah-shi-sle-pah WSA would make either unmanageable because of size, location, and the activities on adjacent lands.

MANAGEMENT PLANS

If any or all of the WSAs are designated as wilderness by Congress, a wilderness management plan that reflects BLM policy in detail for each area will be developed. Similarly, a detailed ACEC management plan will be developed if the Bisti and De-na-zin WSAs are approved as an ACEC.

MANAGEMENT SUMMARY

A general management summary (Table 1-1) has been prepared to serve as a guide for the development of detailed wilderness and ACEC management plans and for the impact analysis in this EIS. Table 1-1 shows the general differences

MAP C

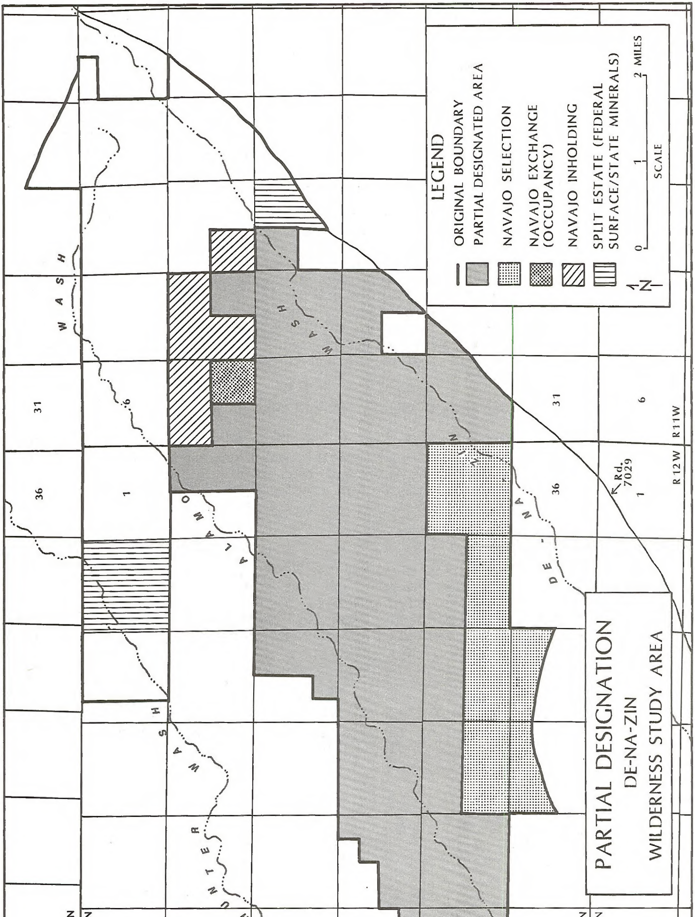

PARTIAL DESIGNATION
DE-NA-ZIN
WILDERNESS STUDY AREA
LEGEND
ORIGINAL BOUNDARY
PARTIAL DESIGNATED AREA
NAVAJO SELECTION
NAVAJO EXCHANGE (OCCUPANCY)
NAVAJO INHOLDING
SPLIT ESTATE (FEDERAL SURFACE/STATE MINERALS)
N
0
1
2 MILES
SCALE
WASH
ALAMO WASH
HUNTER WASH
DE-NA-ZIN WASH
31
36
6
1
Rd. 7029
R 12 W
R 11 W
T25N
T24N
T23N

TABLE 1-1

GENERAL MANAGEMENT SUMMARY
(for each management category)

	Non-Wilderness Designation		
Resource	No Special Designation (Ah-shi-sle-pah WSA, Proposed Action)	ACEC Designation (Bisti and De-na-zin WSAs, No Action Alternative)	Wilderness Designation (Bisti and De-na-zin WSAs, Proposed Action/ De-na-zin WSA, Alternative 1/ Ah-shi-sle-pah WSA, Alternative 2)
Minerals	Public land in the Ah-shi-sle-pah WSA would remain open to all forms of appropriation under the mining laws.	The Bisti WSA is now closed to mineral leasing and is being closed to further appropriation under the mining laws. On the De-na-zin WSA, 43 CFR 3809 regulations and land use planning would allow for development consistent with the intent of ACEC designation.[a]	After December 31, 1983, or the date set by Congress, lands within BLM wilderness designation would be withdrawn from all forms of appropriation under the mining laws, except for valid existing rights.[b]
	Prospecting, exploration, development work, extraction, and patenting would be allowed to continue on public lands.	Prospecting, exploration, development work, extraction, and patenting would be allowed to continue on public lands in the De-na-zin WSA if consistent with the intent of ACEC designation.	Development work, extraction, and patenting would be allowed to continue after December 31, 1983, only on valid claims located on or before that date.[b]
	Patents conveying surface and mineral rights would continue to be issued on public lands.	Patents conveying surface and mineral rights would continue to be issued on public lands in the De-na-zin WSA if consistent with the intent of ACEC designation.	Patents conveying surface and mineral rights would be issued on valid claims before the date the area is included as a part of the National Wilderness Preservation System, and before December 31, 1983.[b] No patents would be issued after December 31, 1983, except for valid claims existing on or before that date.[b]
	Leases conveying mineral rights would continue to be issued on public lands.	On the De-na-zin WSA, special stipulations would be applied to allow leasing of minerals consistent with the intent of ACEC designation.	All laws pertaining to mineral leasing would continue to apply prior to the date an area is designated as wilderness, and after designation until midnight of December 31, 1983.[b]
	Permits to remove common varieties of mineral materials would continue to be issued on public lands.	Permits to remove common varieties of mineral materials would not be issued.	Permits to remove common varieties of mineral materials would not be issued.

TABLE 1-1 (continued)

	Non-Wilderness Designation		
Resource	No Special Designation (Ah-shi-sle-pah WSA, Proposed Action)	ACEC Designation (Bisti and De-na-zin WSAs, No Action Alternative)	Wilderness Designation (Bisti and De-na-zin WSAs, Proposed Action/ De-na-zin WSA, Alternative 1/ Ah-shi-sle-pah WSA, Alternative 2)
Recreation	Facilities and improvements such as trails, bridges, and signs would continue to be provided on a case-by-case basis.	Facilities and improvements such as trails, bridges, and signs would continue to be provided on a case-by-case basis consistent with the intent of ACEC designation.	Construction, maintenance, and removal of facilities and improvements would be done by primitive means and in a way that would not impair wilderness character. Trailhead access points may be located well outside the wilderness boundary to reduce their impact upon the wilderness area.
	Recreation or hobby collecting of mineral specimens (rockhounding) would continue to be allowed.	Recreation or hobby collecting of mineral specimens (rockhounding) would continue to be allowed except on the Bisti WSA.	Recreation or hobby collecting of mineral specimens (rockhounding) would continue to be allowed except on the Bisti WSA.
Land Uses Administrative Structures and Facilities	Administrative sites could be constructed if needed for a specific management function.	Administrative sites would be considered if consistent with the intent of ACEC designation.	New sites needed for wilderness management would be located outside of designated wilderness areas.
	Maintenance or replacement of existing signs, instruments and other improvements of a minor nature, used in connection with such projects as snow surveys, water measurements, game and fish measurements, and geological studies by other agencies would be considered on a case-by-case basis.	Maintenance or replacement of existing signs, instruments and other improvements of a minor nature, used in connection with such projects as snow surveys, water measurements, game and fish measurements, and geological studies by other agencies would be considered on a case-by-case basis consistent with the intent of ACEC designation.	New installations by other agencies may be approved if they are essential to meet the minimum requirements for administration of wilderness.

TABLE 1-1 (continued)

Resource	Non-Wilderness Designation: No Special Designation (Ah-shi-sle-pah WSA, Proposed Action)	Non-Wilderness Designation: ACEC Designation (Bisti and De-na-zin WSAs, No Action Alternative)	Wilderness Designation (Bisti and De-na-zin WSAs, Proposed Action/ De-na-zin WSA, Alternative 1/ Ah-shi-sle-pah WSA, Alternative 2)
Land Uses (cont'd)			
Use of Motorized and Mechanical Equipment, Including Travel	The use of motorized and mechanical equipment would continue to be allowed on public lands.	The Bisti WSA would be closed to motorized and mechanical means of travel. The use of motorized and mechanical means of equipment on the De-na-zin WSA could be restricted or controlled in a manner consistent with the intent of ACEC designation.	Travel and equipment use within a BLM-administered wilderness area would normally be by non-motorized, non-mechanical means consistent with the preservation of wilderness character. Under certain circumstances such as those involving mining or prospecting, established livestock grazing operations, or emergencies affecting the health and safety of visitors, motorized and mechanical equipment use may be authorized.
Research and Studies	Research would continue to be permitted on a case-by-case basis.	Research would continue to be permitted on a case-by-case basis. Projects would be conducted in a manner consistent with the intent of ACEC designation.	Research would be permitted and encouraged as long as all projects are conducted to preserve the area's wilderness character and further its management, scientific, educational, historical, and conservation purposes. Research would be conducted or supported to evaluate the effectiveness of ongoing wilderness management in achieving objectives.
Rights-of-Way	ROWs would continue to be considered on public lands on a case-by-case basis.	ROWs would not be located within the Bisti WSA. Planning and placement of ROWs within the De-na-zin WSA would be considered where consistent with the intent of ACEC designation.	ROWs would not be located within wilderness areas.

TABLE 1-1 (continued)

	Non-Wilderness Designation		
Resource	No Special Designation (Ah-shi-sle-pah WSA, Proposed Action)	ACEC Designation (Bisti and De-na-zin WSAs, No Action Alternative)	Wilderness Designation (Bisti and De-na-zin WSAs, Proposed Action/ De-na-zin WSA, Alternative 1/ Ah-shi-sle-pah WSA, Alternative 2)
Cultural Resources	Salvage, rehabilitation, stabilization, reconstruction and restoration work on archeological and historical sites; excavation; and intensive inventories would continue to be permitted on a case-by-case basis.	Salvage, rehabilitation, stabilization, reconstruction and restoration work on archeological and historical sites; excavation; and intensive inventories would continue to be permitted on a case-by-case basis consistent with the intent of ACEC designation.	Study or management would not normally include any excavation, stabilization or interpretation activities. However, some salvage, rehabilitation, stabilization, reconstruction, restoration, excavation, and intensive inventories may be authorized if such activities would not impair the area's wilderness character.
Paleontology	Salvage of paleontological sites, excavation, and collection of artifacts would be permitted on a case-by-case basis. Emphasis would be placed on acquiring information from those sites that would be affected by coal mining.	Salvage of paleontological sites, excavation, and collection of artifacts would be permitted on a case-by-case basis consistent with the intent of ACEC designation.	Study or management would not normally include excavation, stabilization or interpretation activities. However, salvage of paleontological sites, excavation, and collection of artifacts may be authorized on a case-by-case basis where the project would not degrade wilderness character and such activity was needed to preserve the particular resource.
Visual Resources	The Ah-shi-sle-pah WSA would be managed under Visual Resource Management Classes III and IV.	The Bisti and De-na-zin WSAs would be managed under Visual Resource Management Class II.	Wilderness areas would be managed under Visual Resource Management Class I.
Livestock Grazing	Grazing activities and facilities would continue to be allowed to remain in place, and may be replaced or maintained when necessary for the permittee to properly administer the grazing program.	Grazing activities and facilities would continue to be allowed to remain in place, and may be replaced or maintained when necessary for the permittee to properly administer the grazing program consistent with the intent of ACEC designation.	Grazing activities and facilities would continue to be allowed to remain in place.

TABLE 1-1 (concluded)

	Non-Wilderness Designation		
Resource	No Special Designation (Ah-shi-sle-pah WSA, Proposed Action)	ACEC Designation (Bisti and De-na-zin WSAs, No Action Alternative)	Wilderness Designation (Bisti and De-na-zin WSAs, Proposed Action/ De-na-zin WSA, Alternative 1/ Ah-shi-sle-pah WSA, Alternative 2)
Wildlife	Predator control programs could continue.[c]	Predator control programs would be considered if consistent with the intent of ACEC designation.	Predator control programs must be approved on a case-by-case basis. M-44s would not be allowed in federally designated wilderness areas.
Water Resources	Catchments, and related facilities for the control or use of water (under valid permits or other authority) could be constructed and maintained.	Catchments, and related facilities for the control or use of water (under valid permits or other authority) could be constructed and maintained consistent with the intent of ACEC designation.	Establishment of new water-regulating structures would be considered on a case-by-case basis. Primitive means of transport and hand tools would be used wherever or whenever feasible. Proposals to increase the storage capacity of a reservoir or replace a reservoir that was not under a valid permit when the area was designated a wilderness may be considered.

Notes:

[a] The intent of ACEC designation is to provide special management for outstanding recreational, paleontological, wilderness, and visual resource values.

[b] December 31, 1983 is the date established by the Wilderness Act of 1964 as the end date for minerals activities in wilderness areas, subject to valid existing rights. This date may be changed by Congress.

[c] Animal Damage Control Plan is compiled annually. The use of certain poisons for predator or rodent control is governed by current Environmental Protection Agency and Department of the Interior policies, and by the BLM-USFWS Animal Damage Control Plan.

between ACEC and wilderness management. More specific differences in the two types of management and their degree of restrictiveness may be apparent later when detailed wilderness and ACEC management plans are prepared and specific development proposals are submitted.

AUTHORIZING ACTIONS

U.S. Congress

Congressional action is required before the Bisti, the De-na-zin, or the Ah-shi-sle-pah WSA can become part of the National Wilderness Preservation System or can be dropped from further wilderness consideration. Although Congress retains its position as the final decisionmaker, other federal and state agencies (based on jurisdictional responsibilities) must be consulted by the BLM before a wilderness suitability recommendation is submitted to Congress.

Federal Agencies

U.S. Fish and Wildlife Service (USFWS)

Section 7(c) of the Endangered Species Act of 1973 requires formal consultation with the USFWS when any federal action could have an effect on a threatened or endangered animal or plant species.

Advisory Council on Historic Preservation

Section 106 of the National Historic Preservation Act of 1966, as amended, requires that the President's Advisory Council on Historic Preservation have an opportunity to comment on any undertaking that affects cultural resources in areas listed on or eligible for inclusion in the National Register of Historic Places, in order to protect those resources. This Draft Environmental Impact Statement (DEIS) will be submitted to the Advisory Council for review and comment.

U.S. Geological Survey (USGS) and Bureau of Mines (BM)

Section 603 of FLPMA requires the BLM to comply with the Wilderness Act of 1964. The Wilderness Act requires a minerals survey by the USGS and the BM to determine if any mineral values are present in any area recommended to Congress as suitable for wilderness designation. The report resulting from this summary is available for review at the BLM Albuquerque District Office and the Farmington Resource Area Office.

State Agencies

State Historic Preservation Officer (SHPO)
(New Mexico Department of Finance and Administration, Planning Division)

Under 36 CFR 800, the BLM is required to consult with the New Mexico SHPO before undertaking any actions that will affect cultural resources. This DEIS will be submitted to the SHPO for review and comment.

INTERRELATIONSHIPS WITH OTHER PROJECTS AND PLANS

San Juan Basin Action Plan (SJBAP)

The San Juan Basin is an area where intense demand exists for the development of energy resources. It is a roughly circular topographic feature located in northwestern New Mexico, extending about 130 miles from north to south, and about 100 miles from east to west. The BLM is responsible for the management of much of the land and mineral resources in the San Juan Basin, and has six separate but interrelated projects proposed or ongoing that require BLM action. This Wilderness EIS is one of these projects.

Project	Environmental Document
Coal Preference Right Leasing	EA
San Juan River Regional Coal Leasing	EIS
Bisti, De-na-zin, and Ah-shi-sle-pah Wilderness Study Areas	EIS
Ute Mountain Land Exchange	EA
New Mexico Generating Station	EIS
Bisti Coal Lease Exchange	EA

To effectively consider the various proposals in a cohesive manner, the BLM developed the San Juan Basin Action Plan (SJBAP). The purpose of this plan is to provide a coordinated approach to the timely processing by BLM of the interrelated projects and to ensure that none of the projects is considered in a vacuum.

The CO document is not, in and of itself, an EIS but rather is a portion of each of the individual site-specific EISs (NMGS, SJRRCL, and WSA EISs) and is specifically intended to be a part of the decisionmaking process, providing information to the BLM State Director, Secretary of the Interior and the public concerning the potential cumulative impacts of the proposed power plant, the use of coal resources, wilderness areas, and related proposals in the San Juan Basin.

As outlined in the SJBAP, separate environmental documents have been or are being prepared for the various proposals. These documents discuss the potential site-specific environmental, social and economic effects of each proposal. This Cumulative Overview (CO) considers only the potential cumulative effects of all the proposed actions and their relationship to other activities such as existing oil and gas development, uranium mining, coal mining and other actions likely to occur in the basin in the near future. The baseline essentially includes the existing environmental plus those other actions or proposals that are under construction or have been authorized, e.g., the Plains Electric Power Plant near Pruitt, the Star Lake-Bisti Railroad, the Navajo Indian Irrigation Project (NIIP), etc., but does not include the proposed actions covered in this document.

In reviewing this document, it is important to understand the following relationships between the CO document and the site-specific EISs:

> The CO analyzes only the synergistic cumulative impacts of the site-specific proposed actions and will serve as the cumulative impacts section for each of the site-specific EISs.
>
> The CO will only address the proposed actions from each of the site-specific EISs.
>
> Only those cumulative impacts considered significant are analyzed in the CO.
>
> When possible, the CO will reference information in the site-specific documents.

Chaco Planning Unit Management Framework Plan (MFP)

The Chaco MFP, completed in September of 1981, resulted in decisions that are the background for the Proposed Action and alternatives in this EIS. The MFP concentrated primarily on the Planning Unit's coal resources. Because coal leasing will occur, the MFP recognizes the potential for impacts to other resources in the Planning Unit. Decisions in the MFP were designed to ensure that adequate attention would be given to other resources during coal mining and other energy development. This MFP is available for review at the BLM Albuquerque District Office and the Farmington Resource Area Office.

MITIGATING MEASURES

Mitigating measures and standard operating procedures have been incorporated into the Proposed Action through the General Management Summary (Table 1-1). Furthermore, after detailed management plans have been prepared, BLM policy will allow for the modification of these plans to further protect resource values that may be impacted by visitor use or other wilderness or ACEC activity.

SUMMARY OF IMPACTS

The impacts of the Proposed Action and alternatives are presented in narrative form in Chapter 3, and are summarized in Table 1-2. As shown in these sections of the EIS impact analysis has been conducted for the three WSAs under both wilderness designation and non-wilderness designation. Non-wilderness designation of is two types, ACEC designation (for the Bisti and De-na-zin WSAs under the No Action Alternative) and no special designation (for the Ah-shi-sle-pah WSA under the Proposed Action and the No Action Alternative).

With the exception of mining and mineral leasing, the impacts of ACEC designation would, in many cases, be the same or similar to the impacts of wilderness designation. Where the impacts of the two types of designation are expected to be different, these differences are noted in Table 1-2 and the text of Chapter 3.

TABLE 1-2

SUMMARY OF IMPACTS

Resource and WSA	Proposed Action (Wilderness Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	No Action Alternative (ACEC Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)	Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)
Minerals				
Bisti[a]	No significant impacts.	No significant impacts.		
De-na-zin	Recoverability of underground coal would be reduced from 200 million tons to 140 million tons.	Mineral development would be restricted in areas of high recreational, paleontological, wilderness, and visual resource values.	Same as Proposed Action except smaller acreage involved.	
Ah-shi-sle-pah	Strippable coal (270 million tons) could be removed.	Same as Proposed Action.		Strippable coal resources (270 million tons) could not be mined.
Social and Economic Factors				
Bisti	Wilderness preservation values (unquantified) would be maintained. Wilderness recreation use values could increase to $41,369 annually by the year 2000. Navajo religious values would be preserved.	Some wilderness preservation values (unquantified) may be lost.		
De-na-zin	Wilderness preservation values (unquantified) would be maintained. Wilderness recreation use values could increase to $207,416 annually by the year 2000.	Wilderness preservation values (unquantified) would be lost. The increase in recreation use values would be less than under the Proposed Action.	Wilderness preservation values (unquantified) on 10,684 acres (less acreage than under the Proposed Action) would be maintained. Wilderness recreation use values would increase to $101,137 annually by the year 2000.	
Ah-shi-sle-pah	Wilderness preservation values (unquantified) would be lost. Recreation use values may decrease by the year 2000. Strippable coal reserves could be leased and mined.	Same as Proposed Action.		Wilderness preservation values would be maintained. Wilderness recreation use values would increase to $68,441 annually by the year 2000. Strippable coal reserves with a gross value of $5.94 billion could not be mined.

TABLE 1-2 (Continued)

Resource and WSA	Proposed Action (Wilderness Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	No Action Alternative (ACEC Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)	Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)
Recreation				
Bisti	Area would be closed to recreational ORV use. Recreation values would be enhanced by the preservation of wilderness characteristics.	Area would be managed to protect special values; this would enhance the recreation experience.		
De-na-zin	Area would be closed to recreational ORV use. Recreation values would be enhanced by the preservation of wilderness characteristics.	Area would be managed to protect special values; this would enhance the recreation experience.	Same as Proposed Action, except impacts would occur on less acreage.	
Ah-shi-sle-pah	Due to potential surface mining, opportunity to use area for dispersed or primitive recreational activities could be lost during mine life.	Same as Proposed Action.		Area would be closed to recreational ORV use. Recreation values would be enhanced by the preservation of wilderness characteristics.
Cultural Resources				
Bisti	Increased potential for management of archeological resources would occur.	Similar to Proposed Action.		
De-na-zin	Increased potential for management of archeological resources would occur. However, some impacts from underground mining would also occur.	Similar to Proposed Action, with potential impacts from subsidence.	Same as Proposed Action, except greater pressure would occur on these resources due to reduced acreage.	
Ah-shi-sle-pah	The majority of archeological sites on strippable coal areas would be destroyed by mining.	Same as Proposed Action.		Increased potential for management of archeological resources would occur.

TABLE 1-2 (Continued)

Resource and WSA	Proposed Action (Wilderness Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	No Action Alternative (ACEC Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)	Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)
Paleontology				
Bisti	No significant impacts.	No significant impacts.		
De-na-zin	No significant impacts.	No significant impacts.	No significant impacts.	
Ah-shi-sle-pah	Impacts on 501 localities would be significant, although surface mining could provide some opportunity for recovery of some resources.	Same as Proposed Action.		No significant impacts.
Visual Resources				
Bisti	The WSA would be reclassified from VRM Class II to VRM Class I to ensure protection of natural and visual resources.	VRM Class II designation would remain, maintaining natural and visual resources.		
De-na-zin	The WSA would be reclassified from VRM Class II to VRM Class I to ensure protection of natural and visual resources.	VRM Class II designation would remain, maintaining natural and visual resources.	The WSA would be reclassified from VRM Class II to VRM Class I to ensure protection of natural and visual resources.	
Ah-shi-sle-pah	The WSA would be reclassified from VRM Class II to VRM Classes III and IV because of visual changes.	Same as Proposed Action.		The WSA would be reclassified from VRM Class II to VRM Class I to ensure protection of natural and visual resources.

TABLE 1-2 (Continued)

Resource and WSA	Proposed Action (Wilderness Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	No Action Alternative (ACEC Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)	Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)
Soils				
Bisti	No significant impacts.	No significant impacts.		
De-na-zin	No significant impacts.	No significant impacts.	No significant impacts.	
Ah-shi-sle-pah	Soil erosion and compaction, sediment yield could increase due to development of strippable coal.	Same as Proposed Action.		No significant impacts.
Vegetation				
Bisti	No significant impacts.	No significant impacts.		
De-na-zin	No significant impacts.	No significant impacts.	No significant impacts.	
Ah-shi-sle-pah	Significant impacts could occur (until reclamation is complete) due to development of strippable coal on 4,075 acres.	Same as Proposed Action.		No significant impacts.
Livestock Grazing				
Bisti	No significant impacts.	No significant impacts.		
De-na-zin	No significant impacts.	No significant impacts.	No significant impacts.	
Ah-shi-sle-pah	Loss of 250 AUMs could occur until reclamation occurs due to development of strippable coal on 4,075 acres.	Same as Proposed Action.		No significant impacts.

TABLE 1-2 (Concluded)

Resource and WSA	Proposed Action (Wilderness Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	No Action Alternative (ACEC Designation, Bisti and De-na-zin WSAs; No Special Designation, Ah-shi-sle-pah WSA)	Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)	Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)
Wildlife				
Bisti	Overall impacts of wilderness designation would be beneficial.	Some adverse impacts would occur due to human presence.		
De-na-zin	Overall impacts of wilderness designation would be beneficial.	Adverse impacts may be higher than under wilderness designation due to less restrictive management.	Similar to Proposed Action except on less acreage.	
Ah-shi-sle-pah	Impacts could be significant until successful reclamation occurs due to potential development of strippable coal.	Same as Proposed Action.		Some adverse impacts would occur due to human presence. However, overall impacts of wilderness designation would be beneficial.
Threatened and Endangered Species of Plants and Animals				
Bisti	Generally, T&E species would benefit, but some adverse impacts would occur due to human presence.	Same as Proposed Action.		
De-na-zin	Generally, T&E species would benefit, but some adverse impacts would occur due to human presence.	Same as Proposed Action.	Generally, T&E species would benefit.	
Ah-shi-sle-pah	Impacts could be significant due to development of strippable coal.	Same as Proposed Action.		Generally, T&E species would benefit.
Water Resources				
Bisti	No significant impacts.	No significant impacts.		
De-na-zin	No significant impacts.	No significant impacts.	No significant impacts.	
Ah-shi-sle-pah	Impacts to both ground and surface water could be significant due to development of strippable coal.	Same as Proposed Action.		No significant impacts.

Note: [a] As a result of the Chaco MFP, the Bisti WSA was closed to mineral leasing and is being placed under a minerals withdrawal. Therefore, no significant impacts could occur to the mineral resource under any of the types of designation proposed, because no mineral development would take place.

CHAPTER 2

AFFECTED ENVIRONMENT

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter contains a description of those components of the environment that would be impacted by the implementation of the Proposed Action (wilderness designation for the Bisti and De-na-zin WSAs and non-wilderness designation for the Ah-shi-sle-pah WSA) or alternatives. The length and detail of these descriptions correspond to the expected magnitude, intensity, and duration of impacts discussed in Chapter 3. Technical material and methodology that supports these descriptions is located either in the appendix to this document or in the files of the Albuquerque District Office of the Bureau of Land Management (BLM). Also, a more detailed description of the resources present on each WSA can be found in the Wilderness Analysis Reports, Appendices A, B, and C of this EIS.

MINERAL RESOURCES

The primary mineral resource common to the three WSAs is coal. Oil and gas potential exists in the De-na-zin WSA, and some uranium claims occur.

Approximately 200 billion tons of recoverable coal reserves underlie the San Juan Basin; this figure includes state, private, Indian, and federal coal. Of the 30 billion tons of recoverable federal coal reserves in the San Juan Basin, 10 billion tons were identified in the Chaco Planning Unit Management Framework Plan (USDI, BLM 1981d) to be considered further for leasing. Table 2-1 shows the amount of federal coal reserves in the San Juan Basin and the proportionate amount of coal in each WSA. The impacts associated with coal leasing in the San Juan Basin are analyzed in the BLM's San Juan River Regional Coal Leasing Environmental Impact Statement (USDI, BLM 1982).

Between one and three economically valuable, highly lenticular coal beds underlie the WSAs. They are found in the lower 150 feet of the Cretaceous Fruitland Formation.

Most of the coal is ranked as high-volatile bituminous C (refer to the Glossary for a discussion of rank). The BTUs per pound average between 8,500 and 10,200, resulting in a slightly below-average heating value. Sulfur content averages about 0.6 percent, making this a relatively low-sulfur coal.

The location of the coal ranges in depth from just below the surface to over 500 feet. Companies applying for leases in this area would probably surface mine seams less than 400 feet in depth, recovering deeper coal by underground methods.

There are a number of coal Preference Right Lease Applications (PRLAs--refer to the Glossary) pending on the WSAs, as shown in Table 2-2 and Map B (Chapter 1). These lease applications are discussed in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b).

TABLE 2-1

RELATIONSHIP OF FEDERAL RECOVERABLE COAL RESERVES IN THE WSAs TO TOTAL FEDERAL RECOVERABLE COAL RESERVES IN THE SAN JUAN BASIN[a]

Location of Coal	Amount of Coal (billion tons)	Percent of Total Federal Recoverable Coal Reserves, San Juan Basin
San Juan Basin	30[b]	100
Bisti WSA	.09	0.3
De-na-zin WSA[c]	.14	0.47
Ah-shi-sle-pah WSA	.27	0.9

Source: USDI, BLM 1981d.

Notes:

[a] Recoverable reserve figures are based on a surface recovery rate of 85 percent. The underground recovery rate would vary from 35 percent (under wilderness designation, with the stipulation of no surface subsidence or occupancy) to 50 percent.

[b] This figure represents 15 percent of the approximately 200 billion tons of recoverable coal reserves (federal, state, private and Indian) that underlie the San Juan Basin.

[c] Refer to Appendix D-1 for information on the characteristics and mineability of the coal in the De-na-zin WSA.

TABLE 2-2

PRLAS OVERLAPPING THE WSAs

WSA	PRLA Number	Acreage Overlap
Bisti	NM-11916	320.00
De-na-zin	NM-3834	4,591.28
	NM-3838	3,114.77
Ah-shi-sle-pah	NM-3918	985.04
	NM-3919	3,156.24
	NM-6804	1,214.12

As stated in the Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1979a), "The Secretary [of the Interior] may initiate exchange proceedings for coal under 43 CFR 3430.5-4 if he determines that, among other things, the lands are unsuitable for coal mining because of wilderness considerations." This situation could apply to the PRLAs overlapping designated wilderness areas ,particularly in the case of the Bisti WSA, where an exchange has already been initiated in accordance with Public Law 96-475. [Refer to the Draft Bisti Coal Lease Exchange Environmental Assessment (USDI, BLM 1981a) for more information on this exchange.]

A number of oil- and gas-producing formations underlie the general area of the WSAs but at a much greater depth than the coal beds. The most important of these oil-and-gas producers are the Pictured Cliffs, Cliff House and Point Lookout Sandstones, Mancos Shale, and Dakota Sandstone (all of Late Cretaceous age), the Hermosa and Paradox Formations (of Pennsylvanian Age), and the Ouray Limestone (of Devonian Age). (Refer to Appendices A, B, and C for further information regarding oil and gas leases.)

Portions of the BLM Chaco Planning Unit have been classified as prospectively valuable for oil and gas by the U.S. Geological Survey (USGS--refer to Appendix D-2 for a list of oil and gas leases on the WSAs). A small Known Geologic Structure (KGS) is located inside the De-na-zin WSA. (A KGS is a subsurface geologic structure identified by the USGS as having significant potential for oil and gas production.) A large KGS also exists just outside the northern boundary of the De-na-zin WSA. Other potentially valuable subsurface structural or stratigraphic traps in the area may yet be discovered. Any traps that exist would probably not show surface expression because they predate the deposition of surface material by millions of years.

A few small uranium deposits have been found at scattered localities in the Fruitland Formation. The Jurassic Morrison Formation, which lies about 3,000 to 5,000 feet beneath the surface, contains valuable deposits of uranium. Although these deposits are valuable, they are unlikely to be mined in the near future because of the depressed economics of the present uranium market. The majority of the mining claims covering the WSAs have most likely been for uranium, although this cannot be stated with any certainty because the claimant is not required to give this information. The Wilderness Analysis Reports (Appendices A through C) contain a more detailed discussion of both locatable and leasable minerals associated with each WSA. (Also, a Bureau of Mines-U.S. Geological Survey minerals summary is being prepared and will be on file at the BLM offices in Albuquerque and Farmington.)

With the exception of coal, oil and gas, and uranium, no other significant mineral resources have been identified in the WSAs.

SOCIAL AND ECONOMIC FACTORS

Two types of wilderness economic values exist in the Bisti, De-na-zin, and Ah-shi-sle-pah Wilderness Study Areas, recreation use values and preservation values. The recreation use values are quantified using estimated visitor-days of use (refer to the Glossary) and estimated expenditures for that use. The preservation values have been quantified in other states by taking a sample survey of people's willingness to pay for the preservation of wilderness, and through a projection of what a regional or national population would be willing to pay for a given acreage of wilderness preservation.

Wilderness preservation values can be considered under three different categories. "Option value is defined as the willingness to pay for the opportunity to have access to wilderness areas for recreational use in the future. Existence value is the willingness to pay for the knowledge that natural habitat for plants, fish, and wildlife is protected in wilderness areas. Bequest value is defined as the willingness to pay for the satisfaction derived from endowing future generations with wilderness resources" (Walsh, Gillman and Loomis, 1981).

New Mexico has no study identifying people's willingness to pay for wilderness preservation values. A Colorado model relates this willingness to pay to household income, household size, and median education (Walsh, Gillman and Loomis, 1981). However, using the Colorado data for New Mexico would assume that New Mexicans are willing to pay the same amount for the preservation of wilderness as Coloradoans, which is not likely. Because of the many assumptions already made, it was judged preferable to acknowledge that the method has been employed, but, recognizing the limited applicability of the Colorado data to New Mexico, no quantification was developed.

Very little information relative to visitor use in the WSAs is available. However, most figures available for other areas show substantial increases in wilderness visitor use; designation itself should encourage increased use of the wilderness resources. This increase in use or demand combined with a fixed or perhaps diminishing supply of such areas should result in an increasing value for the remaining wilderness resource.

Bisti WSA

This WSA consists of 3,968 acres that have wilderness preservation values as defined above. In addition to the preservation values, the WSA receives an estimated 675 visitor-days of recreation use annually worth approximately $6,142 (refer to the Recreation section of this chapter for further discussion of this use and the limitations of this conservative visitor-day figure). This total dollar value was calculated assuming a daily value of $9.10. (Refer to Appendix E-1 for method of calculation.)

Livestock grazing permits issued on the Bisti WSA cover approximately 302 AUMs. These permits are reported to have an average appraised value of $857 per animal unit (AU— refer to the Glossary). This represents a total value to the permittees of approximately $21,425 (Fowler and Gray, 1980).

Coal leases exist on the Bisti WSA; the leaseholding company has a considerable but unspecified investment in them. This investment includes such costs as the costs of acquiring the lease, exploration costs, and any other costs incurred in acquiring or holding the lease. Conditions of an exchange are being discussed to remove the leases from the WSA, and to allow the company coal of value equal to the present investment. The Chaco MFP (USDI, BLM 1981d) includes a decision to not allow any mineral development on the Bisti WSA; therefore, the economic value of the minerals would not be available regardless of the type of management that is approved for the WSA.

The Navajo Indian people have offering points, gathering areas and burial sites that are meaningful to their culture and religion. They have not specified locations to the BLM because of the fear that curious outsiders would desecrate them. Some of these locations are likely to occur in the Bisti WSA. (Refer to the Cultural Resources section of this chapter for further discussion.)

De-na-zin WSA

This WSA consists of 19,922 acres that have wilderness preservation values. The recreational use of the WSA is estimated at 3,387 visitor-days per year valued at an average of $9.10 per visitor-day, or $30,822 per year (refer to the Recreation section of this chapter for a discussion of the method of calculation for this visitor-day figure).

Livestock grazing permits issued on the De-na-zin WSA allow the use of 1,216 AUMs (101 AU equivalents). These permits represent an estimated value to the permittees of approximately $857 per animal unit, or $86,557 total.

It is estimated that there are 400 million tons of subsurface mineable coal in this WSA (140 million tons recoverable); an estimated 40 percent of this coal is within two Preference Right Lease Applications (PRLAs). The companies holding these PRLAs have some investment in the costs incurred in meeting PRLA requirements; they expect to recover this cost when they mine the coal. There are also oil and gas leases within the WSA, representing an economic investment. In spite of the level of interest, no minerals production is presently occurring within the WSA.

Within the exterior boundaries of this WSA, some private lands are occupied by Navajo people. One Navajo family lives on public land within the wilderness boundary. This public land is proposed for exchange in the BLM's ongoing Navajo Exchange. Some lands within the WSA are believed to be of social value to the Navajo as gathering areas, offering points, and burial sites. These locations are not specifically identified except to the Navajo people, but there are values and concerns associated with them. (Refer to the Cultural Resources Section of this chapter for a discussion of these values and concerns.)

Ah-shi-sle-pah WSA

This WSA consists of 6,563 acres that have wilderness preservation value as defined above. An estimated 1,116 visitor-days of recreational use occur in this WSA annually, estimated to have a yearly value of $10,156 (refer to the Recreation section of this chapter for a discussion of the method of calculation for this visitor-day figure).

Livestock grazing permits issued on the Ah-shi-sle-pah WSA cover approximately 419 AUMs of grazing annually. The permittees have an estimated value of approximately $857 per AU invested in these permits, for a total of approximately $29,995.

Several Preference Right Lease Applications (PRLAs) overlap with most of the acreage within this WSA. The companies holding these PRLAs have some financial investment in these areas even though there is no coal mining taking place at this time. The companies holding oil and gas leases in the area also have a financial investment. This investment may be minimal, including only the costs of filling out and filing papers, but in other cases may include exploration, assessment, or other costs.

There are believed to be locales within the Ah-shi-sle-pah WSA having social value as gathering areas, offering points and burial sites for the Navajo people.

RECREATION

The three WSAs and adjacent public lands provide a variety of resources for outdoor recreation activities. The area is open country with numerous roads and a variety of landscape factors suitable for dispersed recreation activities. These opportunities include sightseeing, collecting, off-road vehicle (ORV) use, hiking, environmental education and photography. (Refer to the Wilderness Analysis Reports, Appendices A through C of this document, for more information on the primitive and unconfined receation opportunities of the three WSAs.)

In the Bisti WSA, 1,360 acres have been closed to ORV use and collecting of petrified wood. An additional 2,160 acres of the Bisti and 19,000 acres of the De-na-zin WSA have only limited motorized or mechanical means of travel on existing ways and trails.

Past use of the area by recreationists has been hindered by such factors as limited access, dry climate, lack of services and complicated land ownership patterns. However, improved access and public awareness (generated through increased regional and national publicity about the interesting features and opportunities the WSA area has to offer) have caused an increase in the number of recreationists using the WSAs. This increase has been observed by BLM employees seeing additional recreation users in the WSAs, and receiving a larger number of public inquiries about visiting the WSAs and surrounding area to participate in recreation activities.

Recreation visitor use numbers for the WSAs have not been recorded. In order to quantify these figures, projections have been made based on the total estimated 179,235 visitor-days of dispersed recreation use that occured during 1980 in the Chaco Planning Unit (USDI, BLM 1981d). [The source of this visitor-day figure is the demand projections identified in New Mexico's 1976 State Comprehensive Outdoor Recreation Plan (SCORP) for the region in which the WSAs are located.] This total was applied over the 1,031,293 acres of public land in the Planning Unit, averaging out to a use density of 0.17 of a visitor-day per acre per year. Based on this figure, the Bisti WSA is estimated to provide 675 visitor-days, the De-na-zin WSA 3,387 visitor-days, and the Ah-shi-sle-pah WSA 1,116 visitor-days of use per year.

Dispersed recreation, the type of recreation existing in the Chaco Planning Unit, is recreation that occurs generally throughout a large area and is not confined to a specific locale. The lack of adequate data for specific locales in the Chaco Planning Unit has limited the reliability of the above recreation use figures. This limited reliability may result in discrepancies between actual use and projected use. (Refer to Table 2-3 for a listing of these activities, and present and projected use in the Chaco Planning Unit by activity.)

TABLE 2-3

VISITOR USE DEMAND - CHACO PLANNING UNIT

Activity	Visitor-Days Attributable To Public Land[a]	Estimated Demand on Public Land - Year 2000
Hunting	11,578	19,914
Collecting (rocks)	9,569	16,459
Sightseeing	23,763	40,872
Picnicking	21,837	37,560
Camping	10,517	18,089
Backpacking	2,218	3,815
Trailbiking/Four-wheeling	6,568	11,297
Horseback Riding	56,733	97,581
Photography/Painting	26,529	45,630
Visiting Historical Sites	9,923	17,068
TOTALS	79,235	308,285

Source: USDI, BLM 1981e.

Note: [a] A visitor day for BLM recreation planning is defined as "twelve visitor-hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons."

Further, it should be noted that simply prorating figures on an acre-by-acre basis results in visitor use figures for the Bisti WSA that may be lower than actual use. This discrepancy is due to the disproportionate amount of publicity the Bisti WSA has received, the comparative ease of access to this WSA, and the physical attributes of the Bisti that may contribute more positively to visitors' recreation experience.

The Chaco Culture National Historical Park, administered by the National Park Service, is the developed recreation facility nearest to any of the three WSAs. The Bisti WSA is located approximately 16 miles northwest of the park, the De-na-zin WSA 13 miles north, and the Ah-shi-sle-pah WSA's southern point approximately 2 miles north of the park. The Ah-shi-sle-pah WSA's eastern boundary parallels approximately 7 miles of one of the main roads leading to the park. The park has been experiencing an increase in visitation over the past few years; in 1980, the number of visits to the park was estimated at 51,650, compared to 30,550 visits in 1976 (USDI, NPS 1981).

LAND USES

Land uses within the three WSAs include dispersed recreation; livestock grazing, paleontological study, gathering by the local Navajo Indian people of plants and other material for ceremonial and home use (including removal of coal from the Ah-shi-sle-pah WSA and possibly from the Bisti WSA); and, probably, use of parts of each of the three WSAs for offering points, other Navajo ceremonies, and for burial sites. The De-na-zin and Ah-shi-sle-pah WSAs and, to a lesser extent, the Bisti WSA are also used as habitat by a wide variety of wildlife species. In addition, minerals exploration has taken place throughout all three WSAs, although no mining claims have been filed within the De-na-zin WSA. (Refer to the Mineral Resources section of this chapter.)

Recreation use includes such activities as hiking, sightseeing, photographing scenery, and collecting plant fossils and petrified wood (except on approximately 1,360 acres of the Bisti WSA that are now closed to such collecting). All three WSAs contain a wide variety of geologic formations and an abundance of petrified plant and animal remains.

Grazing within the Bisti WSA is confined to a limited portion of the southern part because vegetation is very scarce elsewhere. The De-na-zin WSA also contains limited grazing. In the Ah-shi-sle-pah WSA, grazing takes place along the washes and on the more open rolling areas, particularly on the south portion and along the southeast boundary.

A house and some auxiliary structures are located on the southeast quarter of Section 7, T. 24 N., R. 11 W. of the De-na-zin WSA (Refer to Map H). However, that quarter section has been included in the BLM's Navajo Land Exchange and may be exchanged before a final decision is made on whether or not to designate the De-na-zin WSA a wilderness area.

A few other features related to land use have been identified within the three WSAs during the intensive wilderness inventory conducted by the BLM (USDI, BLM 1979b). Two small earthen dams are located on the southeast part of the Bisti WSA; a small earthen dam and two fencelines are located near the southeast boundary of the De-na-zin WSA; and some fences, five small earthen dams and five rain gages lie within the Ah-shi-sle-pah WSA. (Refer to Maps G, H, and I for locations, and to Appendices A, B, and C for more information on intrusions within the WSAs.)

In addition, several unimproved vehicular routes, many of them very short and all classified as ways, were identified during the BLM inventory. Five such routes were located within the Bisti WSA, 15 within the De-na-zin WSA, and 11 within the Ah-shi-sle-pah WSA.

For additional information regarding recreation use, grazing use, wildlife use, and the uses related to paleontological, cultural and social resources, refer to the appropriate sections of this chapter, Chapter 3, and Appendices A, B, and C.

CULTURAL RESOURCES

Archeological Sites

Bisti

Approximately 1,484 acres (37 percent) of the Bisti WSA have been inventoried for archeological resources in the course of three different surveys (Brownfield, 1978; Zarnowski, 1976; Rorex and Connors, 1977). No archeological sites were identified during any of these surveys. However, a lithic site in the WSA was reported to the New Mexico State Laboratory of Anthropology in 1960. A description of this site is on file at the BLM Farmington Resource Area Office.

The State Historic Preservation Officer (SHPO) has questioned the relative reported site density in the Bisti WSA compared with the De-na-zin and Ah-shi-sle-pah WSAs (refer to Appendix F). The absence of reported Navajo sites in inventoried portions of the Bisti WSA may indicate that none were seen, or may reflect a practice of ignoring recent Navajo sites that has occurred in some archeological surveys in the San Juan Basin.

The one recorded site in the Bisti WSA has been recommended by the BLM in consultation with the SHPO as eligible for the National Register of Historic Places. This recommendation is based on Register Criterion (d), sites "that have yielded, or may be likely to yield, information important in prehistory or history." The letter documenting the consultation between the BLM and the SHPO appears in Appendix F.

De-na-zin

Approximately 3,527 acres (18 percent) within the De-na-zin have been intensively inventoried for archeological resources by Huse et al. (1978). Fifty-two sites have been identified. Five of these sites have two components and two sites have three components (refer to the Glossary). A table summarizing the size, content, probable function, and time period for each site is on file at the BLM Farmington Resource Area Office.

Site components recorded in the De-na-zin WSA represent all the major cultural groups spanning the 10,000 years of known human presence in the San Juan Basin. If these components are an accurate reflection of the distribution of components throughout the entire WSA, the De-na-zin could contain 1,098 components.

The BLM, in consultation with the SHPO, has recommended that 72 percent of the 61 known components in the De-na-zin WSA are eligible for the National Register on the basis of Register Criterion (d) (refer to Appendix F). Table 2-4 shows a breakdown of National Register recommendations by the cultural affiliation of these components.

TABLE 2-4

NATIONAL REGISTER RECOMMENDATIONS,
DE-NA-ZIN WSA

Cultural Affiliation	No. of Components	Register Recommendation Eligible	Register Recommendation Ineligible
Lithic (Indeterminate)	23	18	5
Paleoindian	1	1	0
Archaic	16	16	0
Anasazi	1	1	0
Navajo	19	8	11
Historic (Indeterminate)	1	0	1
TOTALS	61	44 (72%)	17 (28%)

Ah-shi-sle-pah

Four hundred eighty acres (approximately 7 percent) of this WSA have been intensively inventoried for archeological resources by ESCA-Tech (Kemrer, 1981). Eight sites have been identified within the boundaries of the Ah-shi-sle-pah WSA. In addition, a ninth site is known to lie partially within the WSA. One of the nine sites may contain two components. A description of these sites can be found on file at the BLM Farmington Resource Area Office.

Ninety percent of the 10 possible components in the Ah-shi-sle-pah WSA have been recommended by the BLM in consultation with the SHPO as eligible for the National Register on the basis of Register Criteria (d) (refer to Appendix F). Table 2-5 is a breakdown of these recommendations by the cultural affiliation of components.

TABLE 2-5

NATIONAL REGISTER RECOMMENDATIONS,
AH-SHI-SLE-PAH WSA

Cultural Affiliation	No. of Components	Register Recommendation	
		Eligible	Ineligible
Lithic (Indeterminate)	2	2	0
Paleoindian	1	1	0
Anasazi	5	5	0
Navajo	2	1	1
TOTALS	10	9	1

Chacoan Roads

The WSAs lie within a region known to contain a system of prehistoric roads that appear to link major Chacoan Anasazi sites throughout the San Juan Basin. These roads show up as faint swales that are more readily seen on aerial photos than through ground observation. The most thoroughly studied of the roads within the system, the North Road, lies within 1 1/2 miles of the De-na-zin WSA and 1/4 mile of the Ah-shi-sle-pah WSA.

Some of the available aerial photos for the Ah-shi-sle-pah WSA have been evaluated in the BLM Chaco Roads Project, but no systematic evaluation of the photos for the Bisti and De-na-zin WSAs has yet occurred. No road segments are presently known in any of the three WSAs. The importance of any road segments or associated roadside features that may exist in these areas lies in their potential value in the analysis of Chacoan social organization.

Gravesites

One of the most sensitive aspects of traditional Navajo beliefs and practices involves the treatment of the dead. This cultural issue is important in the WSAs because of the probability that they do contain Navajo gravesites. No specific informant interviews have been conducted by the BLM to gather data on numbers or locations of gravesites within the WSAs, but the topic of burials has been brought up by the BLM at Chapter House meetings in connection with proposed developments. It has been the experience of the BLM that Navajo audiences are reluctant to discuss this issue. This reluctance may be based upon traditional Navajo beliefs regarding the "chindi" or evil that remains with the body after the life spirit has departed. This "chindi" has the potential for causing harm to the living when a gravesite is disturbed.

One possible gravesite was identified in the course of an archeological inventory in the Ah-shi-sle-pah WSA. On the basis of archeological data on Navajo settlement patterns gathered by Huse et al. (1978), the badlands zones of all three WSAs may contain Navajo gravesites dating from the period between the return of the Navajo from Fort Sumner in 1868 and World War II.

Sacred Sites

The BLM has not conducted any inventories of sacred sites on the WSAs, but three Navajo sacred sites have been identified to the BLM. The Bisti WSA contains a gathering area for a white clay-like mineral ("gleash") used as a ceremonial paint and as an ingredient in a food made with wild wolfberries (Condie, 1982). The Ah-shi-sle-pah WSA contains an offering point and a gathering area for various minerals and plants used in several different Navajo ceremonies (Mrs. Sarah Charley, personal communication). These plants are also used as medications.

The WSAs may contain additional gathering areas and offering points, as well as other types of sacred sites that have been identified in the general area (see Huse et al., 1978; Kemrer, 1981; Condie, 1982). Sacred sites could include various natural features such as rock formations, buttes, mesas, crevices and springs; Chacoan outliers; constructed features utilized as shrines such as stone cists, boxes and cairns; ceremonial antelope hunting and eagle trapping pits; and sites (including hogans and sweatlodges) at which curing and other religious ceremonies have been performed.

PALEONTOLOGY

The fossil-bearing rocks of the Bisti and Ah-shi-sle-pah WSAs belong to the Upper Cretaceous Fruitland and Kirtland formations. Those rocks in the De-na-zin WSA belong not only to the Fruitland and Kirtland formations, but also to the early Tertiary Ojo Alamo Sandstone. Past paleontologic studies have shown that these formations contain valuable remains of vertebrates, invertebrates, and plants (Kues, et al., 1977). The number and significance value of fossil localities in the three WSAs as reported by Kues, et al. (1977) and recent BLM intensive inventories are presented in Table 2-6. The significance values used here are those defined by Kues, et al. (1977, pp. 163-166) and are explained in Appendix G.

VISUAL RESOURCES

Visual Resource Management (VRM) classes are used by the BLM to serve as guides for reducing visual impacts to levels defined as acceptable in visual management objectives. The VRM classification assigned to a given land area depends on three factors: the inherent quality of the scenery; the visual sensitivity, which expresses the number of viewers and their attitudes toward changes in the scenery; and the distance from which the scenery is viewed. The acceptable levels of visual modifications by class are listed in Table 2-7. (Refer to Maps J, K, and L for VRM class boundaries as they occur on the three WSAs.)

TABLE 2-6

NUMBER AND SIGNIFICANCE VALUES OF FOSSIL LOCALITIES IN THE WSAs

Wilderness Study Area	Class I (Critical--Mitigation or Protection Essential)	Class II (Highly Important--Mitigation Strongly Recommended)	Class III (Important--Mitigation Recommended)	Class IV (Insignificant--Mitigation Optional)	TOTALS
Bisti	2	14	54	105	175
De-na-zin	2	24	76	70	172
Ah-shi-sle-pah	2	29	195	275	501
TOTALS	6	67	325	450	848

TABLE 2-7

VISUAL RESOURCE MANAGEMENT OBJECTIVES BY CLASS

Class I. This class provides primarily for natural ecological changes; however, it does not preclude very limited management activity. Any contrast created within the characteristic environment must not attract attention. This class is applied to wilderness areas, some natural areas, wild portions of the wild and scenic rivers, and other similar situations where management activities are to be restricted.

Class II. Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. A contrast may be seen but should not attract attention.

Class III. Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape.

Class IV. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements inherent in the characteristic landscape.

Class V. Change is needed or may add acceptable visual variety to an area. This class applies to areas where the natural character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. It also is applicable where the quality class has been reduced because of unacceptable cultural modification and the contrast is inharmonious with the characteristic landscape. The class may also be applied to areas that have the potential for enhancement by the addition of acceptable visual variety to an area/site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

Source: BLM Manual 8411.6, 1978.

Note: For Classes II through IV, structures located in the foreground distance zone (0 to 1/2 mile) often create a contrast that exceeds the VRM class, even when they are designed to harmonize and blend with the characteristic landscape. This may be especially true when a distinctive architectural motif or style is designed. Approval by the District Manager is required on a case-by-case basis to determine whether the structure(s) meets the acceptable VRM class standards and, if not, whether it adds acceptable visual variety to the landscape.

The WSAs are presently managed under the Class II designation. Their general landscape character is that of badlands; they exhibit their visual qualities in the highly eroded terrain with many angular and linear landforms such as spires and mushroom formations, ridges, and drainages. The browns, tans, olives and grays prominent in these badland formations are highlighted by maroons and purple banding. The badland formations found in the WSAs are in sharp contrast with the open rolling terrain that lies adjacent to them. Of the three WSAs, the Bisti consists primarily of the badlands, while the other two WSAs contain some areas of open rolling terrain, broad dry washes, and shortgrass vegetation. For more detail pertaining to the visual qualities of each WSA, refer to the Wilderness Analysis Reports (Appendices A through C) in this EIS.

The WSAs are relatively free from intrusions. Those intrusions or cultural modifications present are neither dominant nor extensive features, and have not negated the scenic qualities.

The BLM integrates VRM into its planning and environmental analysis process; this ensures maximum consideration of the existing visual condition when evaluating a proposed land use. The VRM process has been incorporated into the recently completed Management Framework Plan (MFP) for the Chaco Planning Unit in which the WSAs are located.

SOILS

Soils in the Bisti, De-na-zin, and Ah-shi-sle-pah WSAs are derived primarily from sandstone and shale, with inclusions of windblown sand and silt. In general, these soils have low organic matter content, high susceptibility to erosion (refer to Table 2-8 below), and inadequate precipitation. Shallow depths, low water-holding capacities, and high concentrations of soluble salts or exchangeable sodium are other limiting features for use and/or reclamation. The major soil mapping units in the WSAs are: Badland-Rockland, Chipeta-Sheppard, Doak-Shiprock, and Shiprock-Sheppard. For more detailed information on these soils, refer to Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b) and Maps M, N, and O of this wilderness EIS.

TABLE 2-8

POTENTIAL SEDIMENT YIELD BY WSA

		Potential Sediment Yield	
WSA	Acreage	Acre-feet/Year	Tons/Year
Bisti	3,968	19	34,373
De-na-zin	19,922	75	139,750
Ah-shi-sle-pah	6,563	26	49,422

VEGETATION

BLM personnel have mapped and described vegetation sites on the three WSAs based on dominant vegetation, Soil Conservation Service range sites, and soils information.

Six vegetation sites occur within the WSA boundaries, as shown on Maps P through R. Vegetation site acreages by WSA are shown in Table 2-9, and site descriptions are found in Appendix H. (Also refer to Appendices A through C, the discussion under "Wilderness Criteria, Component 4--Diversity in National Wilderness Preservation System" for Bailey-Kuchler classifications and subdivisions in the WSAs.)

TABLE 2-9

VEGETATION SITES
(acres)

WSA	LB-S[a]	LS	SS-PJ	BA	DS-GS	SS-G	TOTALS
Bisti	0	0	0	2,807	1,161	0	3,968
De-na-zin	378	1,176	458	16,711	884	315	19,922
Ah-shi-sle-pah	88	1,143	0	4,536	0	796	6,563
TOTALS	466	2,319	458	24,054	2,045	1,111	30,453

Note: [a] LB-S---Loamy Bottom-Sagebrush; L-S---Loamy Sagebrush; SS-PJ---Sandy to Shallow--Pinyon-Juniper; BA---Badlands; DS-GS---Deep Sand-Grassland-Saltbush; SS-G---Sodic Slopes-Grassland.

LIVESTOCK GRAZING

As shown on Map S, portions of five allotments within the BLM's Chaco Planning Unit are included in the WSAs. The details of allotment administration in the area of the WSAs under Sections 3 and 15 of the Taylor Grazing Act (43 U.S.C. 315, 319a, 315h, 315n) are described in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b). Table 2-10 lists the allotments by WSA, name, and the type of grazing administration. Table 2-11 gives more detailed information about the allotments.

TABLE 2-10

ADMINISTRATION OF GRAZING ALLOTMENTS BY WSA

WSA and Allotment No.	Name	Type of Grazing Administration
Bisti		
6008	Bisti Community	Section 15 - BIA - Adobe Lease
De-na-zin		
6004	Carson-Gallegos	Section 15 - BIA - Adobe Lease
6008	Bisti Community	Section 15 - BIA - Adobe Lease
6010	Black Lake (Paragon Resources)	Section 3 - BLM
6011	Otis Community	Section 15 - BIA - Adobe Lease
Ah-shi-sle-pah		
6010	Black Lake (Paragon Resources)	Section 3 - BLM
6013	Kimbeto Community	Section 3 - BLM

Source: USDI, BLM 1980b.

Livestock grazing has historically been a major land use of the area. However, since about 1950, oil and gas exploration and development has replaced grazing as the major land use in many areas of San Juan County.

Valid range condition data on the allotments does not exist. No BLM Allotment Management Plan (AMP) has been established on any of these allotments. Because of complex land patterns and special rulings under which some allotments are administered with the BIA (Table 2-11), the BLM has limited knowledge of actual livestock operators, livestock numbers, class of livestock and range developments on some allotments.

On most of the community allotments, the majority of operators are individual Navajo Indian family units who run small bands of sheep and goats. Many operators reside on or near the allotment on which their livestock graze, and herd their sheep and goats to and from dwellings daily. This grazing pattern creates heavy over-utilization in a circular area close to the dwellings, decreasing with increased distance from the residence. Range condition on many of these allotments is considered to be poor and in a downward trend as a result of heavy stocking rates, poor distribution, and yearlong use.

WILDLIFE

Approximately 104 species of terrestrial vertebrate wildlife have been verified on the Chaco Planning Unit in habitat types similar to those of the three WSAs (Albee 1982). These include 21 species of mammals, 74 species of birds, and 9 species of reptiles. (The number of species likely to be

TABLE 2-11

WSA ALLOTMENT INFORMATION[a]

WSA and Allot. No.	Allotment Name	Acreage					Qualifications (AUMS)		Admin. Status	No. of Operators	Classes of Livestock[b]	Acres in WSA	AUMs Involved
		Public	Private	State	Indian Allot.	Total	Federal	Total					
Bisti 6008	Bisti Community	9,507	40	2,155	13,598	25,300	764	Adobe Lease[c]	Sec. 15 (BIA[d])	NR[e]	S, C, H, G	3,968.3	302
De-na-zin 6004	Carson-Gallegos	30,121	640	760	18,040	49,561	3,759	Adobe Lease	Sec. 15 (BIA)	NR	S, C, H, G	4,998.10	304
6008	Bisti Community	9,507	40	2,155	13,598	25,300	764	Adobe Lease	Sec. 15 (BIA)	NR	S, C, H, G	940.60	61
6010	Black Lake	40,093	160	15,760	9,838	65,851	4,560	6,780	Sec. 3 (BLM)	1	C	2,400.19	146
6011	Otis Community	30,871	—	240	5,716	36,827	3,260	Adobe Lease	Sec. 15 (BIA)	NR	S, C, H, G	11,583.20	705
TOTALS												19,922.09	1,216
Ah-shi-sle-pah 6010	Black Lake	40,093	160	15,760	9,838	65,850	4,560	6,780	Sec. 3 (BLM)	1	C	1,173.00	75
6013	Kimbeto Community	61,864	—	3,000	101,285	7,162	7,162	10,981	Sec. 3 (BLM)	82	S, C, H, G	5,390.00	344
TOTALS												6,563.00	419

Notes:
[a] Season of use is yearlong for all allotments shown.
[b] Livestock classes: S=sheep, C=cattle, H=horses, G=goats.
[c] Total qualifications for Adobe Lease are not determined for individual allotments; these allotments are leased to Navajo Tribe and are managed through the BIA.
[d] BIA=Bureau of Indian Affairs.
[e] NR=No record.

encountered on the WSAs is probably less, because a great percentage of the WSAs is made up of the Badlands standard habitat type, which is species-poor.) These species are supplemented by several forms of invertebrates including spiders, scorpions and terrestrial insects. No fish or amphibians have been reported by Albee (1982) in or near the three WSAs. A few isolated tanks, reservoirs or ponds may contain fish, tiger salamanders, or spadefoot toads but the locations of such populations are not known.

Wildlife Habitat

Six standard habitat sites are found on the WSAs (Albee 1982). Their percentages on each WSA are shown in Table 2-12 below.

TABLE 2-12

STANDARD WILDLIFE HABITAT TYPES FOUND ON THE WSAs
(percent of each WSA)

Standard Habitat Type	Bisti	De-na-zin	Ah-shi-sle-pah
Sagebrush/Galleta Rolling Uplands	0	8	18
Pinyon-Juniper/ Sagebrush Hills	0	2	0
Badlands	71	84	70
Ricegrass/Snakeweed Dunes	29	4	0
Mixed Shrub Rolling Uplands	0	2	12
Greasewood/Alkalai Sacaton Drainage	--[a]	--	--

Note: [a] This standard habitat type lies in areas too small to be mapped, so no acreage figures are shown. Acres of this type have been combined with acres of the Badlands type, thus probably increasing species diversity on the Badlands type.

Upland Game Species

Important species in this classification include scaled quail (Callipepla squamata) and mourning dove (Zenadura macroura). Some habitat for these species is found in the general region of the WSAs along washes and in mixed shrub habitat sites.

Non-Game Species

There are many species of mammals and birds found in the vicinity of the WSAs that are not considered to be big or upland game species. Common mammals include black-tailed jackrabbits, cottontail rabbits, deer mice and coyotes. Of these species, the coyote (Canis latrans) is perhaps the most dominant and widespread. Non-game birds are represented by passerine songbirds (horned larks, black-throated sparrows, and Say's phoebes), swallows, and raptors. Reptiles are represented by several species of snakes and lizards and a single species of turtle. Fish, toads, and salamanders may be found in some moist areas or temporary ponds.

The prairie dog, which is utilized by the black-footed ferret directly for food, and its burrows for shelter, is found in the vicinity of the WSAs.

THREATENED AND ENDANGERED PLANTS AND ANIMALS

There are no known populations of federally listed threatened or endangered plant species in the three WSAs, even though the potential exists for their occurrence. These areas were surveyed by Martin et al. (1978) and Spellenberg (1976), who found none of the species proposed for listing as threatened or endangered (Federal Register, Vol. 40, No. 117, July 1, 1975; and Vol. 41, No. 127, June 16, 1976). Neither does a computer printout of the New Mexico State Heritage Program (1981) indicate the presence of any of these threatened or endangered plant species in the three WSAs. Mesa Verde cactus (Sclerocactus mesae-verdae) has not been found in the three WSAs, although several areas within the WSAs are ideal for the growth of this cactus. Table 2-13 contains a listing of plant and animal species of federal and state interest.

The printout indicates that three species of special state concern are situated near the three WSAs, and one is found in the De-na-zin WSA. The funnellily, Androstephium breviflorum (Liliaceae) is known from Chaco Canyon, Wyethia scabra canescens (Asteraceae) from Huerfano Mesa and Aletes mcdougalii (Apiaceae) on the top of Chacra Mesa. Bahia oblongifolia (Asteraceae) is known from Alamo Wash in the De-na-zin WSA. These species are of special concern due to their restricted ranges, which extend beyond the WSA boundaries.

Such federal endangered animal species as the bald eagle (Haliaeetus leucocephalus) and the peregrine falcon (Falco peregrinus anatum) are rarely encountered in the WSAs, and then only as transients or fly-overs. The black-footed ferret (Mustela nigripes), often associated with prairie dogs, is known in the region from only three records in McKinley County.

A bird of special concern to New Mexico, Baird's sparrow (Ammodramus bairdii), has been known to occur near the WSAs. It may occur in the WSAs as a migrant.

Important nesting habitat for raptor species of high interest occurs in all three WSAs. Bisti and De-na-zin each have an active golden eagle (Aquila chrysaetos) nest, and one active prairie falcon (Falco mexicanus) nest exists in the De-na-zin WSA. Ferruginous hawk (Buteo regalis) nests are known

TABLE 2-13

THREATENED, ENDANGERED, AND SPECIAL INTEREST PLANT AND ANIMAL SPECIES OCCURRING OR POTENTIALLY OCCURRING IN THE WSAs

Species	Endangerment Category	
	Federal	State
Plants (Family/Species)		
Cactaceae		
Sclerocactus mesae-verdae	a/	
Liliaceae		
Androstephium breviflorum		b-1/
Asteraceae		
Bahia oblongifolia		b-2/
Wyethia scabra canescens		b-2/
Apiaceae		
Aletes mcdougalii		b-2/
Animals (Class/Species)		
Mammals		
Black-footed ferret (*Mustela nigripes*)	a/	c-1/
Birds		
Peregrine falcon (*Falco peregrinus anatum*)	a/	c-2/
Bald eagle (*Haliaeetus leucocephalus*)	a/	c-2/
Golden eagle (*Aquila chrysaetos*)	d/	
Prairie falcon (*Falco mexicanus*)	d/	
Ferruginous hawk (*Buteo regalis*)	d/	
Bairds' sparrow (*Ammodramus bairdii*)		c-2/

Notes: a/ Federal endangered [Endangered Species Act of 1973 (87 Stat. 884 *et seq.*; 16 U.S.C. 1531-1543 as amended].

b/ The State Heritage Program maintains a list of rare and unique plants that are termed "Special Concern Elements." b-1/ = peripheral-narrow distribution; b-2/ = restricted to several states.

c/ State fauna endangerment codes: c-1/ = Group 1 - Species whose prospects of survival or recruitment in the state are in jeopardy; c-2/ = Group II - Species whose prospects of survival or recruitment within the state may become in jeopardy in the foreseeable future. State preservation of endangered species is mandated by the Wildlife Conservation Act (Secs. 17-2-37 through 17-2-46, NMSA 1978).

d/ Protected by the Bald Eagle Protection Act (16 U.S.C. 668-668d).

in all three WSAs. Several nests are also found on the PRLAs within the WSA boundaries. [Refer to the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b) for more detailed information.]

Section 7 consultation for this Wilderness EIS has been initiated with the U.S. Fish and Wildlife Service, and a biological assessment is in preparation.

WATER RESOURCES

Ground Water

The WSAs are located in the San Juan Underground Water Basin (a legal designation). A permit must be obtained from the New Mexico State Engineer to appropriate the ground waters of this basin, and in quantities exceeding 3 acre-feet per year, a formal water right is required. The San Juan Underground Water Basin is part of the larger San Juan structural basin (a geologic feature). This structural basin lies mostly in northwest New Mexico, but also extends into the Four Corners regions of Arizona, Utah, and Colorado.

Generally the bedrock aquifers crop out on the topographically and structurally higher margins of the basin and dip underground towards the basin center. Most recharge to these aquifers probably occurs where streams cross the outcrop areas. Water in the aquifers flows generally downdip towards the basin center where it occurs under artesian conditions. Lyford (1979) provides a general description of the aquifers and ground water hydrology of the San Juan (Underground Water and structural) Basin. Stone, et al. (in press) present detailed information on the geology and hydrology of this basin.

Most sandstones in the basin yield varying quantities of water to wells. Water in these sandstones is commonly under watertable conditions near outcrop areas and under artesian conditions downdip where the sandstones become confined between impermeable shales. Some of the more important aquifers, in ascending order, are the Entrada Sandstone, Westwater Canyon Member of the Morrison Formation, Gallup Sandstone, sandstones in the Mesaverde Group, Ojo Alamo Sandstone, and sandstones in the San Jose Formation. Hydrologic characteristics of most of these aquifers are discussed in the Final Star Lake-Bisti Regional Coal Environmental Impact Statement (USDI, BLM 1979c).

Numerous wells exist in the general area of the WSAs (refer to Maps T, U and V). Most of these are completed in relatively shallow, low-yielding aquifers that contain slightly to moderately saline water (classification according to Swenson and Baldwin, 1965). Most of these wells are used for livestock watering; a few are also used for domestic purposes.

Records on file at the BLM Albuquerque District Office indicate that no production water wells exist in the Ah-shi-sle-pah WSA. However, the BLM and USGS have four observation wells within the WSA (refer to Map V). These wells are completed in bedrock units associated with the coal-bearing Fruitland Formation. They were designed to monitor changes in ground-water conditions if coal mining occurs. Maps showing locations of these wells with respect to major coal areas and tables containing hydrologic information are found in a report by Geohydrology Associates (1980).

Surface Water

The WSAs lie within the drainage basin of Chaco Wash. All streams in this area are ephemeral because water tables are well below the channels. The major drainageways are Coal Creek and Hunter, Willow, Alamo, De-na-zin, Ah-shi-sle-pah, Kimbeto, Betonnie Tsosie, and Escavada Washes. All drainage is southwest into Chaco Wash, the master stream for this area (refer to Map B in Chapter 1).

Generally, well over half the annual precipitation occurs during the period of July through September as localized, intense afternoon thunderstorms. Most of the annual runoff also occurs during this same period in response to these thunderstorms as relatively short-lived, but commonly large-volume ephemeral streamflows. Storm systems of winter and fall are more frontal in nature, and as a result, produce streamflows of longer duration, but smaller volume. Flow-duration curves for many of the streams in this area are presented in Appendix F of the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b).

Certain reaches of many of these streams have been designated as floodplains on flood hazard boundary maps prepared by the Federal Insurance Administration (1977). (These maps are available for inspection at the BLM Albuquerque District Office.) The only floodplain that lies in a potential surface-mining area, in the Ah-shi-sle-pah WSA, is part of Ah-shi-sle-pah Wash in Section 7, T. 22 N., R. 10 W. This section of the wash contains 40 acres that have been designated as a floodplain.

The quality of surface water in the area is poor because of high concentrations of dissolved and suspended solids (water-quality data is on file at the BLM Albuquerque District Office). Suspended solid concentrations are higher in runoff resulting from rainfall than snowmelt. Suspended solids in runoff increase as the percentage of badlands in a drainage basin increases (Bisti West Study Site EMRIA Report, USDI, BLM, BR&GS, 1976).

Numerous small earthen stock tanks have been constructed in the area to capture runoff in some of the smaller channels. However, many of these tanks may be nearly filled with sediment as the BLM has not constructed any ponds since the mid-1960s (Chavez, 1982). Maps T through V show earthen stock tanks in the WSA area.

The BLM and USGS have five rain gages, two water-quality sites, and one streamflow gage within the Ah-shi-sle-pah WSA (refer to Map V). These gages are being used to collect data for a rainfall-runoff modeling project. The purpose of this project is to develop a predictive model for runoff characteristics during surface mining and after reclamation.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter presents analyses of the environmental consequences that would occur from implementation of the Proposed Action or any of the alternatives (as described in Chapter 1 and shown in the matrix below). The scientific and analytic basis for the comparison between those impacts caused by the Proposed Action and those caused by the alternatives is presented, and is also summarized in Table 1-2 of Chapter 1. Technical material that supports the analyses is located either in the appendix of this document or in the files of the Albuquerque District Office of the Bureau of Land Management (BLM).

	Bisti WSA	De-na-zin WSA	Ah-shi-sle-pah WSA
Proposed Action	Wilderness	Wilderness	Non-Wilderness (No Special Designation)
No Action Alternative	Non-Wilderness (ACEC)	Non-Wilderness (ACEC)	*
Alternative 1	*	Partial Wilderness	*
Alternative 2	*	*	Wilderness

*Indicates designation category the same as the Proposed Action for that WSA. (Impact discussions for these categories are not repeated in this chapter.)

ASSUMPTIONS AND ANALYSIS GUIDELINES

Some general assumptions have been developed to guide the analysis of environmental consequences. In some cases, these guidelines were developed to fill data gaps in order to make a more complete analysis. They include the following:

1. The Proposed Action and the alternatives would be implemented in accordance with the discussion in Chapter 1.

2. Most of the impacts from wilderness designation would be the result of increased local, regional and national focus, as well as increased interest and use.

3. Most of the impacts under non-wilderness designation (ACEC and no special designation) would be the result of oil and gas development, underground and surface coal mining, and the anticipated resource damage associated with these activities.

4. Coal resources occurring from the surface down to the 400-foot level would be removed with surface mining techniques.

5. The Bisti Coal Lease Exchange would take place.

6. The 320-acre portion of PRLA NM-11916 that overlaps with the Bisti WSA would not be mined.

7. Specific assumptions were formulated about coal development as follows:

   Bisti WSA
   - Wilderness or Non-Wilderness (ACEC) Designation - In accordance with the Chaco MFP, the Bisti WSA is closed to all mineral leasing.

   De-na-zin WSA
   - Wilderness Designation - Underground coal areas could be leased and mined with no surface occupancy or subsidence.
   - Non-Wilderness (ACEC) Designation - Underground coal areas could be leased and mined with special provisions to protect their scenic, paleontological, recreational, and wilderness values.

   Ah-shi-sle-pah WSA
   - Wilderness Designation - All coal areas would be unsuitable for mining.
   - Non-Wilderness (No Special) Designation - All coal areas could be leased and mined under standard stipulations.

8. Where there was uncertainty regarding the likelihood of an impact or its severity, a reasonable worst-case analysis was used.

UNAVOIDABLE IMPACTS

Mineral Resources

Proposed Action

Bisti. As decided in the Chaco MFP, the Bisti WSA is closed to mineral leasing. Also as a result of the Chaco MFP, a mineral withdrawal for locatable minerals has been initiated, which would result in the WSA being closed to mineral entry. This withdrawal would primarily impact uranium, which is the only significant locatable mineral identified in the WSA. Implementation of the Proposed Action would not alter this status, but would result in a Congressionally sanctioned withdrawal that would be more permanent than a BLM administrative withdrawal.

De-na-zin. Coal and oil and gas are the significant mineral resources in the De-na-zin. Implementation of the Proposed Action would place some restrictions on future coal development in the De-na-zin WSA. These restrictions are noted in Table 1-1 (Chapter 1). All of the coal reserves in the De-na-zin WSA are mineable by underground methods. Under wilderness designation, only underground coal areas could be leased and mined with no impairment of wilderness values. The stipulation of no surface susidence or occupancy would also have to be met before mine plan approval on the De-na-zin WSA.

Mining the De-na-zin WSA with the stipulation of no subsidence would reduce the approximate recovery rate from 50 percent (the usual recovery rate for an underground mine) to 35 percent (USDI, MMS 1982). This would reduce the total recoverable coal in the WSA from 200 million tons to 140 million tons.

Because of the presence of one Known Geologic Structure (KGS) within and one KGS near the northern boundary of the WSA, oil and gas potential is considered to be high. However, the actual productivity would not be known until exploration takes place. Therefore, the importance of the restrictions placed on oil and gas development under wilderness designation cannot be fully assessed until the productivity is known. (Refer to the Glossary for definitions of productivity and potential, and to Appendix B for a discussion of oil and gas productivity in the De-na-zin WSA).

Ah-shi-sle-pah. Under no special designation, all coal areas could be leased and mined under standard stipulations. Therefore, approximately 270 million tons of recoverable coal would be open to development. Under this type of designation, oil and gas and uranium development could also proceed under standard stipulations.

No Action Alternative

Bisti. ACEC designation would not impact the mineral resources on the Bisti WSA, because the WSA is already closed to leasing and a minerals withdrawal is being placed on it.

De-na-zin. Underground coal could be mined: however, ACEC designation would allow for special stipulations to protect the paleontological, scenic, recreational, and wilderness values. These stipulations would depend on site-specific data pertaining to each individual project. Assuming a recovery rate of 50 percent, approximately 200 million tons of recoverable coal would be open to development under ACEC designation.

Oil and gas development would occur under ACEC designation with special stipulations to protect the values for which the ACEC was designated. Therefore, this designation could have some impact on oil and gas development.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Impacts on mineral resources would be similar to those under the Proposed Action; however less coal, oil, gas, and other minerals would be under wilderness designation due to the smaller acreage involved. Accurate estimates of the amounts of these minerals are unavailable at this time.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

All coal reserves in this WSA would be unsuitable for surface mining, resulting in 270 million tons of recoverable coal not being mined. However, for the holders of existing PRLAs, an exchange for coal of equal value would be possible, as provided in 43 CFR 3430 (discussed in the Mineral Resources section of Chapter 2). Such an exchange would likely be made available to the PRLA holders for any coal not mineable on the Ah-shi-sle-pah WSA because of wilderness designation.

The Ah-shi-sle-pah WSA has a low productivity for uranium and oil and gas. Therefore, the restrictions placed on mineral development under wilderness designation would primarily impact only the coal reserves. (Refer to Appendix C for a more detailed discussion of leasable and locatable minerals.)

Social and Economic Factors

Proposed Action

Resources reviewed in making this analysis of impacts are listed in Appendix E-2. Only those resources judged by the BLM to have potential for substantial impacts are discussed in this section.

Bisti. The Proposed Action to designate the approximately 3,968-acre Bisti WSA as wilderness would result in social and/or economic impacts to the following resources.

Impacts on wilderness preservation values are not quantified for reasons explained in the introductory paragraphs of Chapter 2, Social and Economic Factors section. However, these values could increase substantially.

Wilderness recreation use values are $6,142 annually, based on an estimated 675 visitor days of use worth approximately $9.10 per day. Wilderness designation should result in an increase of as much as 10 percent per year, resulting in 4,546 visitor days valued at $41,369 per year (1981 dollars) by the year 2000. (Refer to the Recreation section of Chapter 2 for a discussion of the limitations of... these recreation-use figures.)

Livestock grazing would continue under wilderness designation. Developments and facilities would remain in place and be maintained when necessary for properly administered grazing.

Navajo Indian cultural and religious values would be preserved in wilderness areas.

De-na-zin. The Proposed Action for the De-na-zin WSA would result in the designation of 19,922 acres as wilderness. (Refer to the discussion of preservation values that would result from wilderness designation in Chapter 2.) The same values exist in the De-na-zin WSA as in the Bisti, and the same problems arise in trying to quantify preservation values.

Wilderness recreation use values, currently estimated at $30,822 annually, would increase to $207,416 per year by the year 2000.

Many of the livestock operators are not totally dependent on livestock for their major income, but they are dependent in terms of social status because ranching and owning livestock is part of the preferred lifestyle of the area. Some of these operators are marginal or submarginal in terms of economic efficiency. If wilderness designation requires practices that increase costs or lower production, some of these operators may be forced to sell their livestock. If this happens, the operators would be given opportunity to sell their permits (with an appraised value of approximately $857 per animal unit--Fowler and Gray, 1980).

The Proposed Action would result in minerals impacts because the coal reserves could only be mined without subsidence or surface occupancy. Because De-na-zin would be deep mined under these stipulations, only 35 percent of the coal reserves (140 million tons) would be recoverable, compared to the 50 percent (200 million tons) that would be recoverable under ACEC designation. The 60 billion tons of coal that could not be mined has an estimated gross value of $1.32 billion ($22 per ton). From a national accounting stance, the negative impact would amount to the gross value of the coal ($1.32 billion) minus an estimated $1.02 billion (cost of production), or $300 million dollars. Over the expected 40 to 50 years of mine life, this would amount to a loss of $6 to $7.5 million annually.

State and local people consider the net value of the coal as well as the cost of production as positive influences on the local economy. Therefore, they would see the economic loss of the 60 billion tons of coal as being nearly the total gross value ($1.32 billion), or $26.4 to $33 million annually for the life of the mine.

Revenue resulting from a 12.5 percent royalty (approximately $165 million total) and a severance tax of $.81 per ton (approximately $48.6 million) would not accrue to the national and state economy over the life of the mine(s).

Impacts on Navajo Indian cultural and religious values found on the De-na-zin WSA would be preserved as on the Bisti WSA. (Refer to the Cultural Resources Section of Chapter 2 for further information on these values.)

Ah-shi-sle-pah. The Proposed Action of placing this 6,563-acre WSA under no special designation would open it to mineral leasing, coal mining and other resource uses. This action would affect wilderness preservation and recreation use values. Wilderness recreation use values (currently estimated at $10,156 per year) would decrease.

The Proposed Action would make available for leasing and mining 270 million tons of recoverable surface-mineable coal in this WSA. Income, employment, community infrastructures and some social factors would be impacted by coal mining. The quantification of these impacts would relate to the volume and time schedule of coal production, which is not available at this time.

The environmental impacts of coal mining occurring in the Ah-shi-sle-pah WSA near the Chaco Culture National Historical Park are outside the scope of this Wilderness EIS. They are discussed in the San Juan River Regional Coal Leasing EIS (USDI, BLM 1981f) and will be included in the environmental analyses that must be prepared before mine plans can be approved.

Utilization of other resources in this WSA would not be expected to result in substantial social or economic impacts.

No Action Alternative

Loss of wilderness preservation values would be the only substantial economic impact of placing the Bisti and De-na-zin WSAs under ACEC designation. This alternative would most likely lead to the development and utilization of the coal under the De-na-zin WSA (approximately 200 million tons of coal, or 50 percent of the 400 million ton reserve) with a gross value of approximately $4.4 billion at a price of $22 per ton.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Partial designation would maintain the wilderness preservation values on approximately 10,684 acres of the De-na-zin WSA. (These preservation values have been discussed in the Social and Economic Factors section of Chapter 2.) This would be a positive impact that cannot be quantified adequately at this time for New Mexico. The recreation use values of this WSA would also be maintained, increasing from the estimated 1981 figure of $16,527 (1,816 visitor-days at $9.10 per day) to approximately $101,137 annually (1981 dollars) by the year 2000. (Refer to Chapter 2, Recreation section for a discussion of the limitations of these recreation-use figures.)

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Wilderness designation of the Ah-shi-sle-pah WSA would maintain wilderness preservation values on 6,563 acres. (These preservation values are not specifically quantified but they are described in Chapter 2.) Recreation use values would increase from the present $10,156 annually to $68,441 annually by the year 2000.

The negative socioeconomic impact of wilderness designation would be the loss of economic returns from mining 270 million tons of surface mineable coal. The gross value of this coal is estimated at $5.94 billion, which would not pass through the local economy. From the national economy, the loss would be $2.43 billion, the net value of the coal. If this coal was not mined, the State of New Mexico would lose $.81 per ton of coal for severance tax revenues not collected ($218.7 million), along with the federal royalty value of this coal, which is estimated to be $742.5 million (USDI, BLM 1981d).

These impacts would be lessened or eliminated altogether if the coal under the PRLAs is exchanged as provided for in 43 CFR 3430.

Recreation

Proposed Action

Bisti and De-na-zin. The designation of the Bisti and De-na-zin WSAs as wilderness would mean recreation use and enjoyment of the area could still continue, but would be limited to those types of activities compatible with the wilderness setting and management policy. One such nonconforming recreation activity, off-road vehicle (ORV) use, would be prohibited. Should the Bisti and De-na-zin WSA be designated wilderness, the entire acreage of both would be closed to ORV use. (However, other ORV areas are available on public lands outside of the WSAs.)

BLM wilderness areas would be managed to provide for their use and enjoyment in ways that are consistent with preservation of their wilderness character and special features, and that would leave them unimpaired for future use and enjoyment as wilderness. Public use for recreation purposes is generally a prevalent use of wilderness.

If visitor use threatens to impair the area's wilderness character, managers would take action to prevent impairment. Though the actual visitor use in the WSAs is unknown, national recognition of these areas as wilderness is expected to generate additional visitor use of at least 10 percent per year. This rate would follow the past national trend of visitor use in wilderness areas (USDI, BLM 1981d); it would fall between the projected population increase in the region of 72 percent by the year 2000 (USDI, BLM 1981e) and the 14 percent average yearly increase in visits from 1976 through 1980 at Chaco Culture National Historical Park (USDI, NPS 1981). By the year 2000, it is estimated that the Bisti WSA would provide 4,546 visitor days and the De-na-zin WSA 22,793 visitor days. (The economic significance of the recreation use of these WSAs is discussed in the Social and Economic Factors section of this chapter.) It should be kept in mind that, as discussed in Chapter 2, the actual visitor use for the Bisti WSA may be higher than the figure given above.

The act of designation should have little impact on the quality of or opportunity to experience the primitive and unconfined type of recreation that now exists in these WSAs. The designation, however, may place added demands on adjacent lands for such things as trailhead facilities and parking once a wilderness management plan has been developed.

Ah-shi-sle-pah. If the Proposed Action is implemented, the 6,563 acres in the Ah-shi-sle-pah WSA would be included under no special designation for the uses and activities indicated in the Chaco MFP (USDI, BLM 1981d). Public use of the WSA for participation in dispersed recreation activities may be impacted through disruption or displacement of the recreationist, and the quality of experience would vary with the management activities. Should this WSA be leased for coal development, the opportunity to use the area for dispersed or primitive recreation purposes and solitude (conservatively estimated at 1,116 visitor-days of use per year) would be lost during the life of the mining operations. Many of the other land management activities would not be as disruptive to recreation as coal development.

No Action Alternative

Under this alternative, the impacts to recreation use on the Bisti and De-na-zin WSAs under ACEC designation would be minimal. Most recreation activities would still be allowed to occur with the potential of more intensive management (refer to Table 1-1 in Chapter 1 for general management policies). The closure of 1,360 acres to ORV use and collecting of petrified wood would continue. An ACEC management plan would be developed with procedures to evaluate proposed projects for consistency with the intent of ACEC designation. Visitor use on these public lands in the Chaco Planning Unit can be expected to increase with the imminent increase in the population of the region.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Under this alternative, impacts to recreation on the 10,684-acre wilderness area would essentially be the same as those discussed for the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

The anticipated impacts to recreation on the Ah-shi-sle-pah WSA under this alternative would be similar to those identified for the Bisti and De-na-zin WSAs under the Proposed Action. Public use for recreation purposes is generally a prevalent use of wilderness, but the type of recreation activities must be compatible with the wilderness setting and management policy. More restrictive measures would be required to preserve the wilderness values under wilderness designation than would be required under non-wilderness designation.

Land Uses

Proposed Action

Bisti. Under wilderness designation, the present land uses (primarily dispersed recreation and a minimum amount of grazing) would continue. Instances of recreation use would likely increase due to the special designation and as population increases occur in the region.

Future construction of facilities or administrative structures would be prohibited within the WSA except for the minimum necessary for management of the area as wilderness, subject to approval by the Director of the BLM. Some future developments by other agencies may be permitted by BLM officials. Research and other studies would be permitted within the WSA without the use of motorized equipment or construction of temporary or permanent structures. (Exceptions could be approved by the State Director after determination that the equipment or structures would be essential to management of the specific wilderness and that no other feasible alternatives exist.)

Travel for recreation or for administrative purposes would be limited to non-motorized, non-mechanical means.

De-na-zin. The present land uses on the De-na-zin WSA would be impacted in the same way they would be impacted on the Bisti WSA. Additionally, as several oil and gas leases have been issued for the land within the De-na-zin WSA, there is a possibility of future discovery and development of these resources (refer to the Mineral Resources section of Chapters 2 and 3, and Table 1-1 in Chapter 1).

Restrictions on construction, developments, methods of transportation and the use of motorized equipment as discussed in the preceding subsection on the Bisti WSA would also be applicable to the De-na-zin WSA.

The residence located on the southwest quarter of Section 7, T. 24 N., R. 11 W., would be within the final boundaries of this WSA under the Proposed Action. The structure would be subject to BLM wilderness management policy unless this quarter section is exchanged under the Navajo Land Exchange.

Ah-shi-sle-pah. This WSA would have no special designation under the Proposed Action. Present land uses would continue. However, if the underlying coal is surface mined, the land use of this area (approximately 18 percent of the WSA) would change during the period that mining and related activities are conducted. After mining and reclamation, the area would probably return to some of the present uses. However, certain uses such as recreation, paleontologic and cultural study, and religious activities would probably be restricted or eliminated on the surface mined areas. Several oil and gas leases and mining claims have been issued for the land within this area; there is a possibility of future discovery and development of these resources (refer to the Mineral Resources section of Chapters 2 and 3, and Table 1-1).

No Action Alternative

If the Bisti and De-na-zin WSAs were designated as an ACEC, impacts would be similar to those described under the Proposed Action except that the De-na-zin WSA could be more intensively mined for underground coal. Instances of recreation use would increase as the area becomes more widely known and population in the region increases.

Under ACEC designation, use of motorized or mechanical means of travel within the WSAs would probably continue to be limited to existing ways and trails.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Under this alternative, approximately 10,684 acres of this WSA would remain under wilderness designation. The land uses on this part of the De-na-zin WSA would be the same as those under the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Impacts on land uses within the Ah-shi-sle-pah WSA would be similar to those described for the De-na-zin WSA under the Proposed Action.

Cultural Resources

Proposed Action

Bisti. The Proposed Action would have a positive impact upon archeological resources by enabling whatever sites or Chacoan roads that may exist to be managed for their inherent scientific, educational, and heritage values. However, increased use by visitors could produce a rise in site damage from trampling and casual collecting of sherds, points and other artifacts.

Access by Navajos to any sacred sites that exist would be allowed; however, restrictions would be placed on the use of motorized vehicles. Increases in recreational visitation by non-Navajos could reduce privacy at these sites. Impacts resulting from vandalism on these sites cannot be predicted.

De-na-zin. Wilderness designation of the De-na-zin WSA under the Proposed Action would provide a measure of protection to ensure the continued existence of cultural resources. Other impacts from the Proposed Action would be the same as those described for the Bisti WSA, with the following additions. The operation of nearby mine equipment could weaken the foundations and walls of any structural sites that may be present. Sites could be disturbed by water erosion produced by alterations in existing drainage patterns.

Noise from mining could impair the suitability of a locale to serve as a sacred offering point, and the presence of non-Navajos could reduce privacy.

Ah-shi-sle-pah. Archeological inventories at a level determined appropriate by the Office of Surface Mining (OSM) in consultation with the State Historic Preservation Officer (SHPO) and the BLM would be conducted before mining. The majority of archeological sites on leased lands would be destroyed by mining.

Existing gravesites not identified and reinterred or avoided by surface mining could be destroyed. Gathering areas, offering points, and all other sacred sites that may be present could also be destroyed. The sacred qualities of sites adjacent to mine areas could be impaired by noise, vibration, dust, and the presence of construction and mine workers.

No Action Alternative

Bisti. Impacts to archeological resources under ACEC designation would be similar to those of the Proposed Action, with the exception that site vandalism might be less than under wilderness designation. Impacts to sacred sites would be similar to those of the Proposed Action, except that user privacy could be greater because recreation activity is not expected to be as high as under wilderness designation.

De-na-zin. Impacts to archeological sites under ACEC designation would be similar to those under the Proposed Action, except potential impacts from subsidence could occur. Gravesites could also be subject to subsidence.

Impacts to sacred sites would be similar to those under the Proposed Action, but noise and subsidence could impair the suitability of a locale as a sacred offering point. Decreases in visitor numbers could result in greater privacy.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

The general types of impacts to archeological resources would be similar to those addressed under the Proposed Action for the De-na-zin WSA. However, pressure on these resources could be intensified because wilderness visitors would be utilizing a smaller area.

Impacts to the security and privacy of any existing sacred sites within the De-na-zin WSA could be intensified by the presence of wilderness visitors within a smaller area. Additional Navajo settlement outside the WSA could increase the need for suitable offering points.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Impacts would be the same type as those described for the Proposed Action on the De-na-zin WSA.

Paleontology

Proposed Action

Bisti and De-na-zin. Under wilderness designation, paleontological resources would be protected and remain available for scientific study. The recovery of fossils for scientific purposes would be permitted. However, excavation and collection of fossils would be allowed in wilderness areas on a case-by-case basis only if such actions were needed to save fossils from destruction, and when such recovery would not unnecessarily degrade wilderness characteristics. (Refer to the BLM's Wilderness Management Policy, Section III.I.5.) This would mean that it may be possible to recover only the most significant fossils from Class I, II, and III localities in the Bisti and De-na-zin WSAs. Wilderness designation of the Bisti and De-na-zin WSAs would also provide an opportunity to preserve important fossil-bearing strata for future field-oriented educational activities.

Ah-shi-sle-pah. Significant impacts to paleontological resources as a result of no special designation of the Ah-shi-sle-pah WSA could be expected. These impacts would result primarily from surface mining. Mining could cause the destruction of 501 known fossil-collecting localities within all the classes discussed in Chapter 2.

Collection and excavation of fossils for scientific and educational purposes would not be restricted under this type of designation.

No Action Alternative

Impacts to paleontological resources as a result of ACEC designation of the Bisti and De-na-zin WSAs could occur from any kind of surface-disturbing activity allowed in these areas. However, part of the intent of ACEC designation is to protect paleontologic values. Thus, impacts to paleontological resources from surface disturbances would be minimized.

Excavation of fossil sites for scientific purposes would be allowed on a case-by-case basis.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Impacts to paleontological resources as a result of implementing this alternative would be the same as those identified under the Proposed Action for De-na-zin, but fewer localities would be directly affected.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Under this alternative, impacts to paleontological resources in the Ah-shi-sle-pah WSA (501 localities) would be of the same type as those identified for paleontology under the Proposed Action in the Bisti and De-na-zin WSAs.

Visual Resources

Proposed Action

Bisti and De-na-zin. If the Proposed Action is implemented, the Bisti and De-na-zin WSAs would be reclassified from VRM Class II to VRM Class I, the most restrictive class. This classification would protect the scenic quality and the natural character of the areas through management objectives that provide primarily for natural ecological changes. However, these objectives do not preclude limited management described as allowable in the legislation or policy establishing the area. This reclassification would be in accordance with manual guidelines and the BLM's general policy toward the management of wilderness.

Ah-shi-sle-pah. If the Proposed Action is implemented, the Ah-shi-sle-pah WSA would be reclassified from VRM Class II to Classes III and IV as indicated in the Chaco MFP (USDI, BLM 1981d). Of the total 6,563 acres, 1,313 acres would be reclassified as Class III and 5,250 acres would be reclassified as Class IV (refer to Map L).

No Action Alternative

Bisti. Under ACEC designation, the 3,968 acres of the Bisti WSA would remain as VRM Class II. When wisely planned and properly managed, development can take place in an ACEC if the basic intent of the protection of wilderness, recreational, paleontological, and visual resource values is ensured. The extent of visual impact that future management activities would create on the landscape through ACEC designation would be determined by using the BLM's contrast rating process. Visual impacts should be commensurate with the VRM Class II management objective; that is, changes in any of the basic elements (form, line, color, and texture) caused by the activity should not be evident in the characteristic landscape.

De-na-zin. Under ACEC designation, the 19,922 acres of the De-na-zin WSA would be managed under VRM Class II designation. Management under this VRM class allows for changes in any of the basic elements (form, line, color, texture) caused by a management activity only if the changes are not evident in the characteristic landscape. A contrast may be seen but should not attract attention. Evaluation of proposed activities on a case-by-case basis would be done to determine the extent of change created in any given landscape and to specify appropriate design or mitigation measures using the BLM's contrast rating process.

Surface-disturbing activities or placement of necessary structures would have to be consistent with the intent of ACEC designation. Consideration would be given to the long-term protection or enhancement of the visual resource.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

The designation of approximately 10,684 acres within the De-na-zin WSA as wilderness (refer to Map C in Chapter 1) would result in those acres being reclassified from VRM Class II to VRM Class I. This would allow for the protection and enhancement of the visual resources in keeping with the management objectives of Class I, as described for the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

The anticipated impacts of this alternative would be similar to those identified for the Bisti and De-na-zin WSAs under the Proposed Action. Impacts to the visual resources are anticipated to be minimal as a result of reclassifying the 6,563 acres to VRM Class I, because only activities consistent with the management objectives of that class would be allowed.

Soils

Proposed Action

Bisti and De-na-zin. The majority of soils in these two WSAs have high erosion susceptibility (refer to Table 2-8 for potential sediment yield on each WSA). The Proposed Action would cause a slight overall reduction in erosion, compaction, and structural degradation of soils in the Bisti and De-na-zin WSAs, primarily through strict control of the areas. Greater nutrient availability would also occur.

However, localized increases in these soil disturbances may take place as footpaths and trails become established. These increases would be greater if over-visitation occurs in the Bisti WSA. Potential exploration and/or development of valid mineral leases in the De-na-zin WSA would also cause increased soil-disturbing impacts. These activities, however, would be subject to modification if they threaten to cause a loss of wilderness values.

Ah-shi-sle-pah. No special designation of the Ah-shi-sle-pah WSA may result in somewhat higher rates of soil erosion and more extensive soil compaction than would occur under wilderness designation. This special designation may cause both long-term and short-term increases in the amount of sediment yield, particularly if surface mining of coal occurs. (Refer to Table 2-8 in Chapter 2 for potential sediment yield on the WSAs.) The additional sediment yield caused by surface mining would potentially decrease the life of downstream water retention or diversion structures, and reduce available nutrients and soil media supporting vegetation production. Because site-specific uses are at present unknown, effects on the soil due to the type and level of activity can be analyzed only on a relative basis.

No Action Alternative

Under this alternative, ACEC designation would result in the same type of impacts as the Proposed Action. These impacts would be caused primarily by increased use and access, as well as different types of use; however, they cannot be quantified until site-specific proposals have been identified.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Under this alternative, impacts on the soil resource on the 10,684 acres of the De-na-zin WSA designated as wilderness would be similar to those described for the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Designation of the Ah-shi-sle-pah WSA as a wilderness area would preclude surface mining and ORV use, and subject other valid uses to strict controls. The overall result would be a reduction in potential sediment yield, lessened impacts on soil structure, and greater nutrient availability. As in the other alternatives, site-specific data is needed for quantitative discussion.

Vegetation

Proposed Action

Bisti and De-na-zin. Under the Proposed Action, the Bisti and De-na-zin WSAs would receive some degree of vegetation disturbance as a result of increased visitor use and forage consumption by recreational livestock (refer to the Glossary). This disturbance is expected to be minimal, but is unquantifiable at this time.

Ah-shi-sle-pah. Proposed coal development under no special designation of the Ah-shi-sle-pah WSA would have a greater impact on vegetation than development permitted on Bisti and De-na-zin under wilderness designation. [Refer to the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b) for a discussion of this proposed development.] Approximately 5,355 acres of native vegetation would be removed from the Ah-shi-sle-pah WSA. This figure represents the total estimated acreage disturbance as a result of the proposed surface mining in this WSA. Acreages of various vegetation types that would be removed are shown in Table 3-1. (Also refer to Map R.)

TABLE 3-1

VEGETATION SITES REMOVED BY SURFACE MINING, AH-SHI-SLE-PAH WSA

Vegetation Site	Acres
Loamy Bottom-Sagebrush	10
Loamy Sagebrush	863
Badlands	3,686
Sodic Slopes-Grassland	796
TOTAL	5,355

Vegetation productivity of the area would be lost from the time of disturbance until reclamation is completed. Disturbance/reclamation timeframes are presently unknown and therefore cannot be analyzed at this time. Through reclamation, a shift of vegetation type from shrub to grassland or mixed grassland-shrub is expected to some degree. Additional vegetation losses may occur outside the strippable area as a result of the construction of surface structures, roads, and other facilities.

No Action Alternative

Under ACEC designation, impacts on vegetation would be the same as under the Proposed Action. The amount and extent of vegetation disturbance is unquantifiable at this time.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Under this alternative, impacts to vegetation would be the same as those discussed for the Proposed Action, but they would occur on a smaller area.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Under this alternative, vegetation disturbance by coal development would not occur. Vegetation disturbance due to development of other existing leases (or valid claims) and increased visitor use (including recreational livestock) would occur to some unquantifiable degree.

Livestock Grazing

Proposed Action

Bisti and De-na-zin. Under the Proposed Action, wilderness designation for the Bisti and De-na-zin WSAs would not significantly impact livestock grazing. Grazing activities would continue and range developments would remain in place or would be replaced when necessary to properly administer grazing programs. Permits issued for grazing before wilderness designation would remain in effect.

Any new construction or repair of existing range developments would be done in such a way as not to impair wilderness values. The restrictions on vehicular or mechanical equipment used in grazing management in favor of primitive transportation (horseback) would reduce damage to localized areas of vegetation and thus provide additional forage to livestock. Minor impacts resulting from human use, especially along areas with trails and parking, would disturb the grazing routines of some livestock and force them to relocate to other areas.

Ah-shi-sle-pah. Nearly 5,355 acres of this WSA are scheduled for the mining of coal, which would cause the loss of nearly 337 federal AUMs until reclamation restores them. This figure represents 80 percent of the total AUMs available on the WSA. The impacts of the surface mining of coal are described in detail in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b).

No Action Alternative

Impacts on livestock grazing in the Bisti and De-na-zin WSAs under ACEC designation would be slight when considered on an allotment-by-allotment basis. The repair and replacement of range structures would be accomplished through the use of steel and concrete and with vehicular or mechanical equipment when required, thus reducing costs. The use of primitive transportation would not be as significant a factor in livestock management on an ACEC as in wilderness. Livestock would not be subjected to as much potential human influence as in a wilderness area.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

On the basis of acreage, approximately 652 federal AUMs would remain under BLM wilderness designation. Impacts of wilderness designation on livestock grazing in the De-na-zin WSA are described above under the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

The impacts on grazing in the Ah-shi-sle-pah WSA under wilderness designation would be similar to those described for the Bisti and De-na-zin WSAs under the Proposed Action. The most important impact under this alternative would be that the coal under 5,355 acres would not be surface mined, thus maintaining the forage that would sustain about 337 federal AUMs annually.

Wildlife

Proposed Action

Bisti and De-na-zin. Generally, wildlife would benefit from wilderness designation of the Bisti and De-na-zin WSAs. In those areas that are further from mining, trails, roads, and parking areas, many species of wildlife could be expected to aggregate and, as their habitat improves with time, increase their populations.

Most of the adverse impacts on wildlife would be evident in both WSAs near roads and adjacent parking areas, along major trails, and in those areas of the De-na-zin WSA that may be mined. In these areas many wildlife species would be disturbed by human encroachment and would be prevented from carrying on many life functions. Increased human influences may reduce numbers of some wildlife species or eliminate them altogether (although others, more tolerant of human influences, may increase). These impacts would be minimized for those species whose range extends outside the WSAs.

Ah-shi-sle-pah. The status of wildlife in the Ah-shi-sle-pah WSA under no special designation would remain the same in many areas and decline in others. Serious impacts would be realized in those areas under PRLA classification and potential competitive leasing should surface coal mining occur. The impacts of this mining on wildlife and its habitats are described in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b) and the San Juan River Regional Coal Leasing EIS (USDI, BLM 1982).

Basically, mining and related activities would force many species of wildlife to leave areas of mining and move to adjacent areas or leave the region entirely. Other forms, primarily small rodents, reptiles, and amphibians, would be destroyed by mining or associated activities such as vehicular traffic. Human influences, such as illegal or accidental shooting, would extract a toll on many major species of mammals and on numerous bird species. Only when the goals of reclamation measures begin to manifest themselves after the cessation of mining would these areas again become useful to wildlife.

No Action Alternative

Impacts on wildlife would be substantially the same as those under the Proposed Action. However, the most significant impacts to wildlife from placing the De-na-zin WSA under ACEC designation would be from surface structures and human presence associated with the mining of coal. The impacts from underground mining on the wildlife habitat of the De-na-zin WSA would not be as great as those described for surface mining on the Ah-shi-sle-pah WSA under the Proposed Action because of the difference in the two types of mining.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

Wildlife on the approximately 10,684 acres of the De-na-zin WSA under wilderness designation would generally benefit from this type of designation. The impacts would be similar to those described under the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Benefits to wildlife realized from wilderness designation for the 6,563-acre Ah-shi-sle-pah WSA would be similar to those described under the Proposed Action for the Bisti and De-na-zin WSAs. Wilderness designation would preserve wildlife habitat on approximately 5,355 acres that would otherwise be subject to surface coal mining.

Threatened and Endangered Plants and Animals

Proposed Action

Bisti and De-na-zin. Species of threatened or endangered plants and animals and those of special interest would generally benefit from wilderness designation of the Bisti and De-na-zin WSAs. Some of these species of plants may develop new areas of growth as parts of the habitat receive additional protection, encouraging vegetation communities to develop into assemblages that more closely approximate climax communities than under current conditions. As the habitat improves, some species of threatened or endangered animals may move into these regions because of improved shelter or increased numbers of prey species.

The possibility exists that a large number of people would be using the areas with trails; they may damage or destroy habitat potentially usable by threatened or endangered animal species in the WSAs. This impact would be of greatest concern for raptor species, which are sensitive to human disturbance during nesting. Wilderness designation, while protecting the WSAs from development, would also increase the chances of raptor nest abandonment due to human activities. Management techniques are available to control visitor use and alleviate these impacts; these techniques would be developed and defined in the wilderness management plan after designation.

Ah-shi-sle-pah. Most of the Ah-shi-sle-pah WSA has been placed under PRLA status for the surface mining of coal. Approximately 5,355 acres of potential habitat for critical vegetation or prey species of known threatened or endangered animals would be damaged or destroyed by mining and associated activities. The impacts of mining have been described in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b).

No Action Alternative

The placement of the Bisti WSA under ACEC designation would have impacts on plants and animals of threatened, endangered, and special interest status similar to the impacts of wilderness designation.

Impacts to these species of plants and animals in the De-na-zin WSA under ACEC designation would be similar to those on the Bisti WSA, except that underground mining and associated activities on the PRLAs may damage some areas that could sustain vegetation of special concern. Likewise, some habitat suitable for prey species of known threatened or endangered animals would be affected, resulting in localized declines in numbers of these populations.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

The habitat for plants and animals of threatened, endangered, and special interest status would be impacted on the approximately 10,684 acres of the De-na-zin WSA that would be designated as wilderness under this alternative. These impacts have been summarized under the Proposed Action.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Special concern plants and animals and threatened and endangered species of animals on the Ah-shi-sle-pah WSA would be impacted under wilderness designation in a manner similar to the Proposed Action on the Bisti and De-na-zin WSAs. In addition, wilderness designation would prohibit the surface mining of coal on some 5,355 acres. This would preserve potential habitat for plants and animals of special concern and for prey species of known threatened and endangered species of animals.

Water Resources

Proposed Action

Bisti and De-na-zin. The water resources in the De-na-zin WSA would not be impacted by the Proposed Action. Over-visitation in the Bisti WSA under wilderness designation, however, could result in soil compaction, which in turn could cause an increase in runoff, erosion, and sediment load of streams. Because of the relatively small size of the Bisti WSA, this compaction could be a greater problem than in the De-na-zin WSA. The BLM's wilderness management policy, however, allows for watershed restoration in cases where deteriorated soil and hydrologic conditions caused by human beings or their influences create a serious threat to or loss of wilderness values.

Ah-shi-sle-pah. Under no special designation of the Ah-shi-sle-pah WSA, some impacts to both ground and surface water may occur as a result of coal mining. (Refer to Map B in Chapter 1 for the location of surface drainages and possible areas of coal development on the WSAs.) Many of these impacts are detailed in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b).

As mining progressed through alluvial channels, local shallow ground water sources would be destroyed. After reclamation, less runoff to channels downstream may occur, with subsequent less recharge to the alluvial aquifers. This would be very localized, however.

No Action Alternative

No impacts on water resources would occur.

Alternative 1 (Partial Wilderness Designation, De-na-zin WSA)

No impacts on water resources would occur.

Alternative 2 (Wilderness Designation, Ah-shi-sle-pah WSA)

Under wilderness designation of the Ah-shi-sle-pah WSA, only non-motorized access to the four BLM/USGS observation wells would be allowed, so maintenance would be more difficult. The same type of impact would occur to the rain gages, water-quality sites, and the streamflow gage within the WSA.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Proposed Action

The relationship between short-term use and long-term productivity can be more easily understood by defining what constitutes the short term and the long term. Under wilderness or ACEC designation, the short term is that timeframe in which a wilderness or ACEC management plan would be implemented, estimated to range from 10 to 15 years. The long term is that timeframe beginning at completion of implementation of the management plan and continuing in perpetuity.

Under no special designation, the short term is the life of the operation (for mining or oil and gas development, this is expected to last from 10 to 30 years). The long term would begin after reclamation, and would continue in perpetuity.

Bisti and De-na-zin

The short-term use of the De-na-zin WSA as a wilderness area would not affect the long-term productivity of the coal resource. The long-term productivity of high-quality wilderness recreational experience would be ensured in both the Bisti and De-na-zin WSAs. Cultural and archeological values would be protected. The long-term productivity of soils, vegetation, wildlife, and livestock grazing in the Bisti and De-na-zin WSAs would continue.

Ah-shi-sle-pah

The short-term use of this WSA under non-wilderness designation would affect the long-term productivity of wilderness values. The long-term productivity of livestock grazing and wildlife would be enhanced by short-term use in the Ah-shi-sle-pah WSA because of the improved vegetation after successful reclamation. Cultural and archeological values not protected by coal mining unsuitability criteria would be lost. Paleontological resources would also be lost.

No Action Alternative

The relationship between short-term use and long-term productivity for the Bisti and De-na-zin WSAs under ACEC designation would be similar to that under the Proposed Action, with somewhat greater impacts due to more flexibility in allowable surface-disturbing activities.

Alternative 1

The relationship between short-term use and long-term productivity would be the same as that for the De-na-zin WSA under the Proposed Action, but on a reduced scale because of the smaller acreage involved.

Alternative 2

The relationship between short-term use and long-term productivity would be the same as that under the Proposed Action for the Bisti and De-na-zin WSAs. However, 270 million tons of recoverable coal would be unavailable for mining in the Ah-shi-sle-pah WSA.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Proposed Action

Coal is a nonrenewable resource and cannot be replaced after removal by mining. Any coal mining in the Ah-shi-sle-pah WSA would be considered an irretrievable commitment of the coal resource. Some impacts from the mining activity itself, however, would be reversible after mining has ceased and successful reclamation has taken place.

Paleontological, cultural and archaeological values lost because of natural and manmade causes in the Bisti and De-na-zin WSAs would be considered irreversibly and irretrievably committed. Data not recovered prior to mining in the Ah-shi-sle-pah WSA would also be irreversibly and irretrievably lost.

The loss of natural surface features and other wilderness values in the existing landscape as a result of mining activity in the Ah-shi-sle-pah WSA would be considered irreversible because the WSA could not be returned to its exact previous appearance.

In the Ah-shi-sle-pah WSA, vegetation production would be lost entirely on the surface mined areas until reclamation efforts return the WSA to the present level of production. Because livestock and wildlife carrying capacity are directly tied to this resource, any loss in vegetation production could result in an irretrievable loss of livestock grazing capacity and wildlife numbers. This loss would be sustained only until vegetation production is returned to its pre-mining level.

Although mining activity would result in the recovery of some fossils, many would be destroyed. This loss would be irreversible and irretrievable.

Irreversible and irretrievable commitments of water resources in conjunction with coal mining activities are detailed in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981b). This analysis relates to potential coal mining under the Proposed Action on the Ah-shi-sle-pah WSA. Appropriation of water would be an irreversible and irretrievable commitment of the resource.

No Action Alternative

The irreversible and irretrievable commitments of resources for the Bisti and De-na-zin WSAs under ACEC designation would be similar to those described under the Proposed Action. They may, however, be of greater magnitude because of the increased variety of allowable surface-disturbing activities under ACEC designation, especially on the De-na-zin WSA.

Alternative 1

The irreversible and irretrievable commitments of resources described for the De-na-zin WSA under the Proposed Action would also apply to this alternative, but on a reduced scale because of the smaller acreage involved.

Alternative 2

The irreversible and irretrievable commitments of resources described for the Bisti and De-na-zin WSAs under the Proposed Action would also apply to the Ah-shi-sle-pah WSA under wilderness designation.

CHAPTER 4

CONSULTATION AND COORDINATION

CHAPTER 4

CONSULTATION AND COORDINATION

INTRODUCTION

This chapter summarizes the BLM's efforts to obtain input from other government agencies, private industry, special interest groups, and individual members of the public during the development of this Draft EIS. It also includes the results of formal discussions the BLM has held with other authorizing agencies to comply with various regulations.

SUMMARY OF SCOPING

On October 29, 1981, the notice announcing BLM scoping meetings was published in the Federal Register (Vol. 46, No. 209, p. 53528). Notices were also featured in the local newspapers of Farmington, Taos, and Albuquerque.

During November of 1981, the BLM held three scoping meetings to gather public opinion about what issues should be discussed in this EIS. The cities of Farmington, Taos, and Albuquerque were the sites of these meetings; total attendance was 57.

The concerns voiced by the public at these meetings were varied, but the impacts of wilderness designation on other resources seemed to be the issue of most importance. Coal mining and its impacts, reclamation, economics, and the impacts of other resource activity on wilderness were other issues raised. (Appendix I contains a complete listing of attendees and their concerns.) These issues have been considered as this EIS was being written.

CONSULTATION AND COORDINATION IN THE PREPARATION OF THE DEIS

During the preparation of the DEIS, contact was made with the State Historic Preservation Officer regarding eligibility of sites on the WSAs for the National Register. This was necessary to ensure compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470) and the Regulations of the Advisory Council on Historic Preservation for the Protection of Historic and Cultural Properties (36 CFR 800).

In February of 1982 formal consultation under Section 7 of the Threatened and Endangered Species Act of 1973 was initiated with the U.S. Fish and Wildlife Service by the BLM Albuquerque District and New Mexico State Office.

REVIEW OF THE DEIS

Comments on this Draft EIS are being requested from the government agencies and private groups listed in Table 4-1. (It should be noted that this is a representative sample only and does not constitute the entire mailing list.)

TABLE 4-1

DOCUMENT RECIPIENTS

Federal Government

Agencies

- Department of Agriculture
  - Soil Conservation Service
- Department of the Interior
  - Bureau of Indian Affairs
    - Albuquerque Area Office
    - Eastern Navajo Agency
    - Navajo Area Office
  - Bureau of Reclamation
  - National Park Service
    - Chaco Center
    - Division of Remote Sensing
    - Indian Cultural Resources
    - Southwest Regional Center
  - Office of Surface Mining, Reclamation and Enforcement
  - U.S. Fish and Wildlife Service
    - Office of Ecological Services
  - U.S. Geological Survey

Officials

- Senator Pete Domenici
- Senator Harrison Schmitt
- Representative Manuel Lujan, Jr.
- Representative Joe Skeen

Tribal Government

- Navajo Nation -- Chairman Peter McDonald
- Presidents, Navajo Off-Reservation Chapters
  - Baca
  - Crownpoint
  - Lake Valley
  - Nageezi
  - Ojo Encino
  - Pueblo Pintado
  - Torreon

Local Government

- San Juan Regional Committee
- County Commission
  - McKinley County
  - Sandoval County
  - San Juan County
- McKinley County
  - Planning Department
  - Soil and Water Conservation District
- San Juan County
  - Planning Department
  - Soil and Water Conservation District
- Mayor of Cuba
- Mayor of Farmington

State Government

State of New Mexico Agencies

- A-95 Clearinghouses
- Bureau of Mines and Mineral Resources
- Commerce and Industry Department
  - Economic Development Division
- Department of Finance and Administration
  - Planning Division
    - Coordination/Clearinghouse Bureau
    - Historic Preservation Bureau
- Energy and Minerals Department
- Health and Environmental Department
  - Environmental Improvement Division
- Highway Department
- Land Office
- Natural Resources Department
  - Administrative Services Division
    - Planning Bureau
      - Heritage Section
  - Department of Game and Fish
  - Soil and Water Conservation Division
  - Water Resources Division
    - State Engineer
- New Mexico Surface Mining Commission

Officials

- Governor Bruce King
- Senator Christine Donisthorpe
- Senator W.S. Eoff
- Senator Edward A. McGough III
- Senator Jack M. Morgan
- Senator John Pinto

Private Groups

Special Interest Groups

- National Council of Public Lands Users
- National Wildlife Federation
- Natural Resources Defense Council
- Navajo Medicine Men's Association
- New Mexico Archaeological Society
- New Mexico Citizens for Clean Air and Water
- New Mexico Wilderness Study Committee
- San Juan County Museum Association
- San Juan Wildlife Federation
- Sierra Club
- Wildlife Management Institute
- Wilderness Society

Universities

- New Mexico State University

TEAM ORGANIZATION

This statement was prepared by a team of BLM professionals from the Albuquerque District Office. Report writers, support personnel and other contributors to the EIS effort are indicated in Table 4-2. BLM's Washington Office (WO) and New Mexico State Office (NMSO) provided internal, periodic review.

TABLE 4-2

LIST OF PREPARERS

Report Writers/Reviewers

Name	Assignment	Education	Experience
Ralph Sena	Team Leader	Bachelor of University Studies	BLM - 5 yrs. Environmental Specialist
John C. Arwood	Vegetation	BS Range Management Animal Husbandry Agricultural Economics	BLM - 13 yrs. Range Conservationist
Tom Bargsten	Soils	BS Soil Science	BLM - 6 yrs., SCS - 11 yrs. Soil Scientist
John E. Bristol	Visual Resources, Recreation	BS Landscape Architecture	BLM - 5 yrs., USFS - 6 yrs. Landscape Architect
Steve Craigg	Water Resources	BS Geology MS Geology	BLM - 7 mos., USGS - $1^1/2$ yrs. Hydrologist
Richard A. Diener	Livestock Grazing, Threatened and Endangered Plants and Animals	Ph.D. Zoology	BLM - 5 yrs. Wildlife Biologist NMFS/NOAA - 14 yrs. Fisheries Biologist
Richard Fagan	Chief, Planning and Environmental Coordination Staff	MS Range Science BS Forest Range Management	BLM - 2 yrs. Chief, Planning and Environmental Coordination Staff, 5 yrs. Area Manager
Donald R. Floding	Land Uses	BS Urban Planning MS Town and Regional Planning	BLM - 3 yrs. Community Planner, Local Government - 9 yrs. Planning Director
L. Kent Hamilton	Social and Economic Factors	BS Agricultural Economist	BLM - 5 yrs., BIA - 16 yrs. Economist and Land Use Planner
Steven R. Marcus	Minerals	MS Geology	BLM - 8 yrs. Geologist
Jim Ramakka	Wildlife	BS Wildlife Science MS Wildlife Management	BLM - 4 yrs., Peace Corps - 2 yrs. Wildlife Biologist
Coleman R. Robison	Paleontology	Ph.D. Paleobotany	BLM - 3 yrs. Paleobotanist
Sarah W. Spurrier	Technical Coordinator, Editor	BA Psychology	BLM - 5 yrs. Writer/Editor
Carol Thompson	Cultural Resources	BA, Post-MA Anthropology	BLM - 3 yrs. Archaeologist BIA - 11 yrs. Teacher, Anthropology
Mary Zuschlag	Environmental Coordinator	BS Natural Resource Conservation	BLM - 4 yrs. Environmental Specialist SCS - 2 yrs. Soil Conservationist

TABLE 4-2 (concluded)

Support Personnel

Name	Experience (BLM)	Name	Experience (BLM)
Myrna Finke	2 yrs. Cartographic Aid	Karen Noling	2 yrs. Clerk Typist
Penelope A. Mahon	2^1/2 yrs. Clerk Typist	Irene Rivera	8 mos., Clerk Typist
Jeffery S. Nighbert	4 yrs. District Cartographer	Shirley Torres	2 yrs. Supervisory Editorial Assistant

Other Contributors

Bill Brady – Indian Coordinator (NMSO)

Bob Calkins – Area Manager, Farmington Resource Area (Albuquerque DO)

Danny Charlie – Interpreter, Farmington Resource Area (Albuquerque DO)

Liz Hummer – Environmental Specialist (Albuquerque DO)

New Mexico Generation Station EIS Staff

New Mexico State Office, San Juan Energy Projects Staff

William L. Overbaugh – Recreation Technician/Photographer (Albuquerque DO)

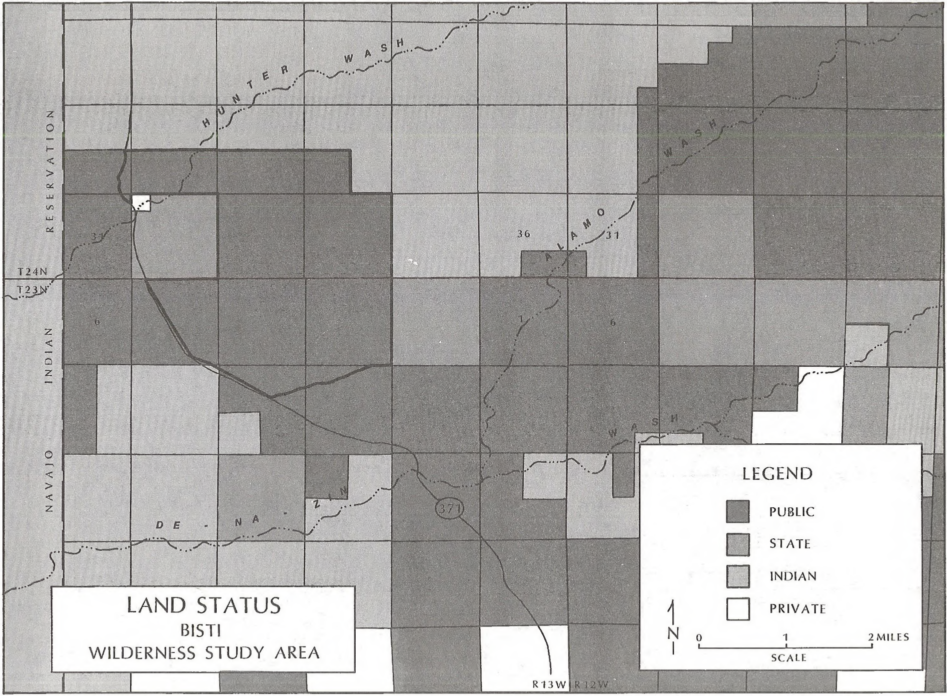
Al Pack – Indian Coordinator (NMSO)

Betty Sladek – Planning Coordinator (Albuquerque DO)

Joe Sovcik – Environmental Coordinator (NMSO)

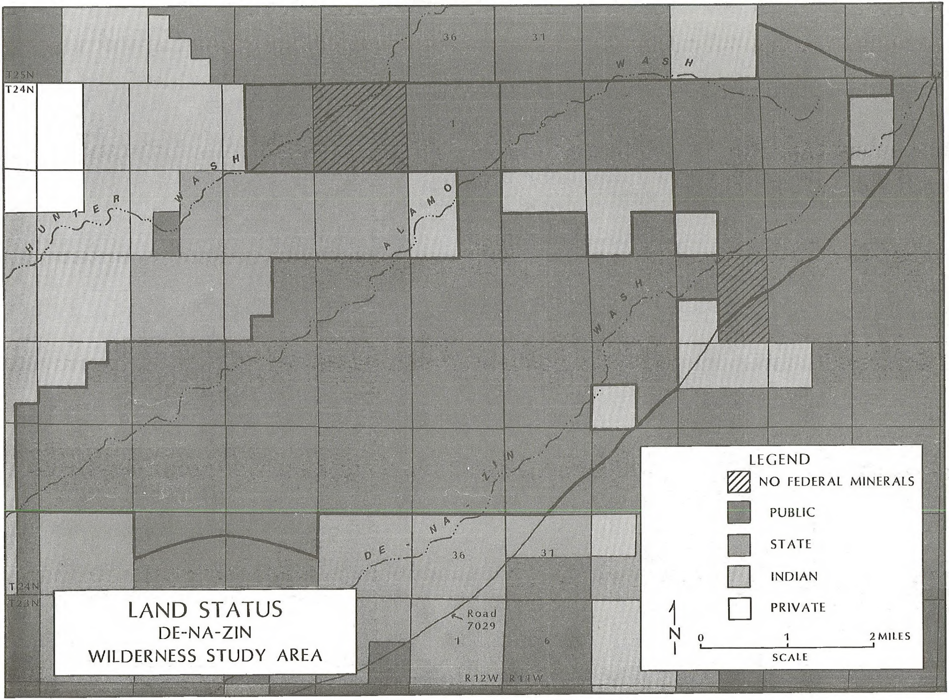
Dan Wood – Wilderness Specialist (NMSO)

MAPS



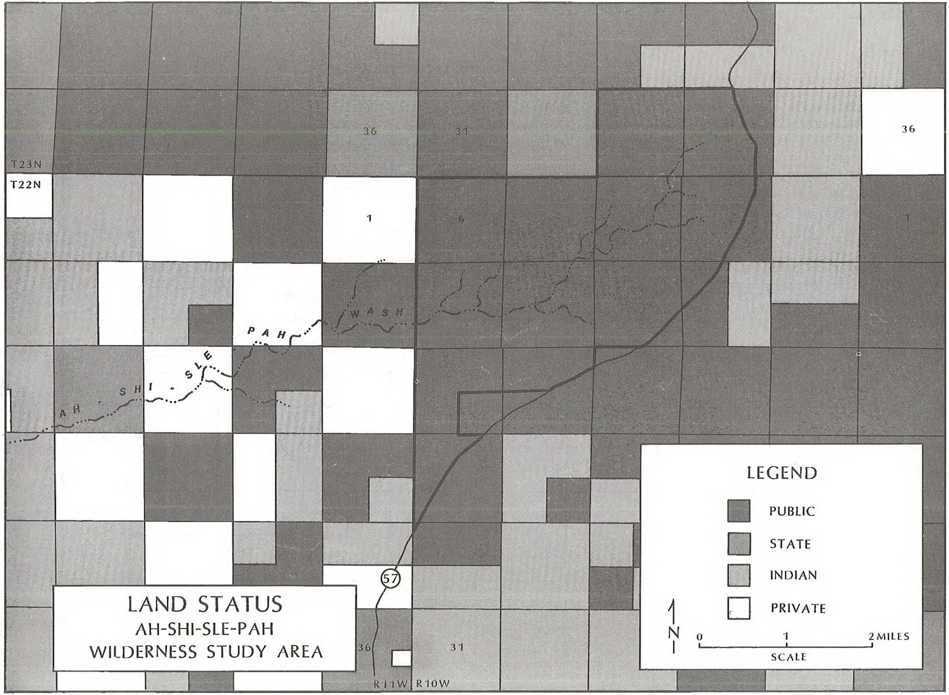
LAND STATUS
BISTI
WILDERNESS STUDY AREA

MAP D



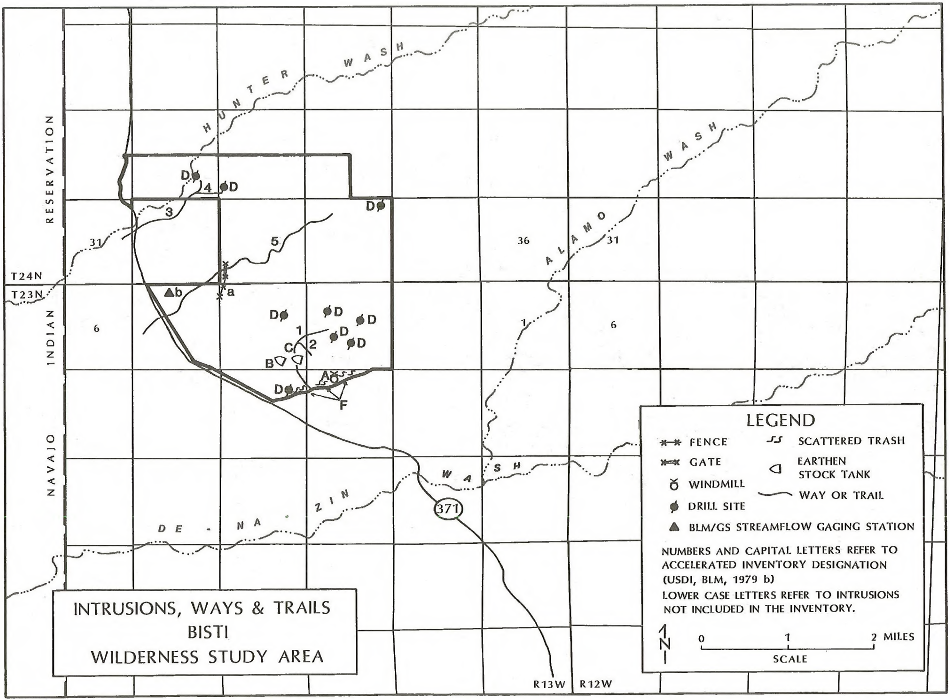
LAND STATUS
DE-NA-ZIN
WILDERNESS STUDY AREA

MAP E



LAND STATUS
AH-SHI-SLE-PAH
WILDERNESS STUDY AREA

MAP F



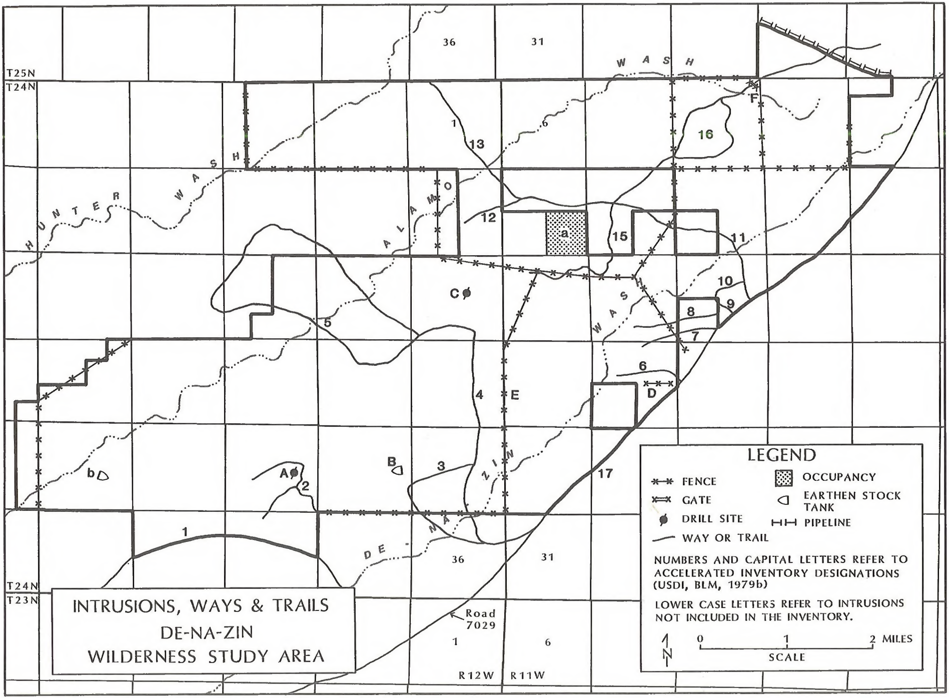
NUMBERS AND CAPITAL LETTERS REFER TO ACCELERATED INVENTORY DESIGNATION (USDI, BLM, 1979 b)

LOWER CASE LETTERS REFER TO INTRUSIONS NOT INCLUDED IN THE INVENTORY.

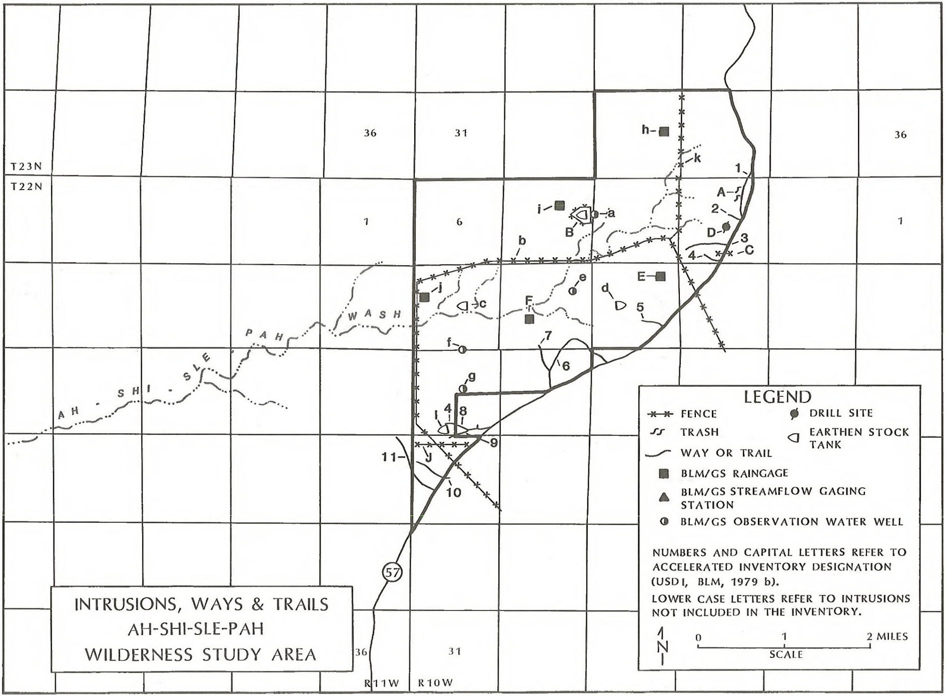
INTRUSIONS, WAYS & TRAILS
BISTI
WILDERNESS STUDY AREA

MAP G

MAP H



INTRUSIONS, WAYS & TRAILS
DE-NA-ZIN
WILDERNESS STUDY AREA

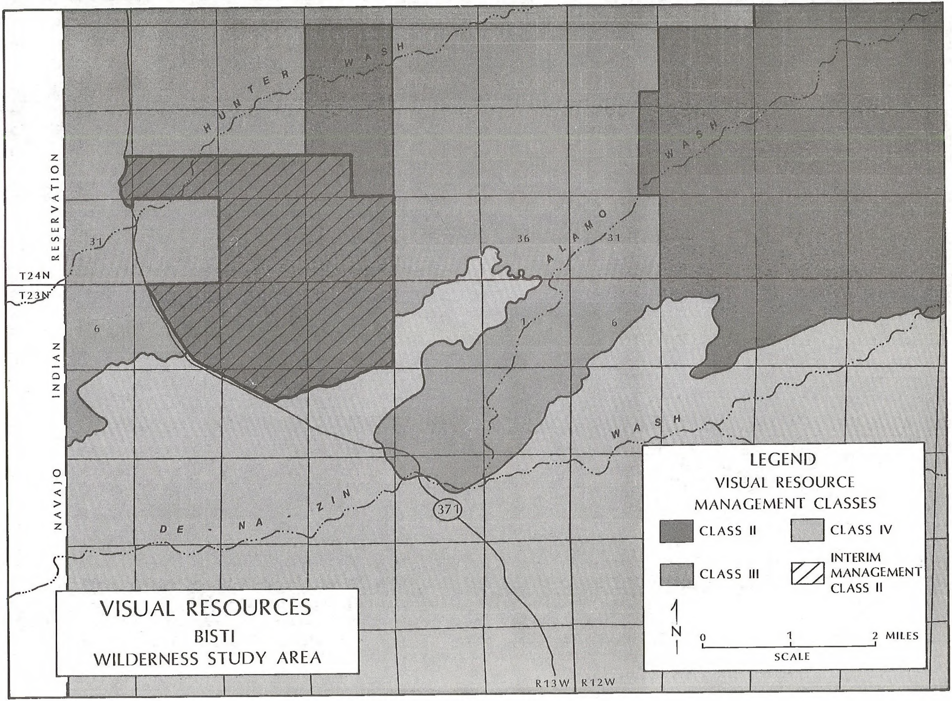


NUMBERS AND CAPITAL LETTERS REFER TO ACCELERATED INVENTORY DESIGNATION (USDI, BLM, 1979 b).

LOWER CASE LETTERS REFER TO INTRUSIONS NOT INCLUDED IN THE INVENTORY.

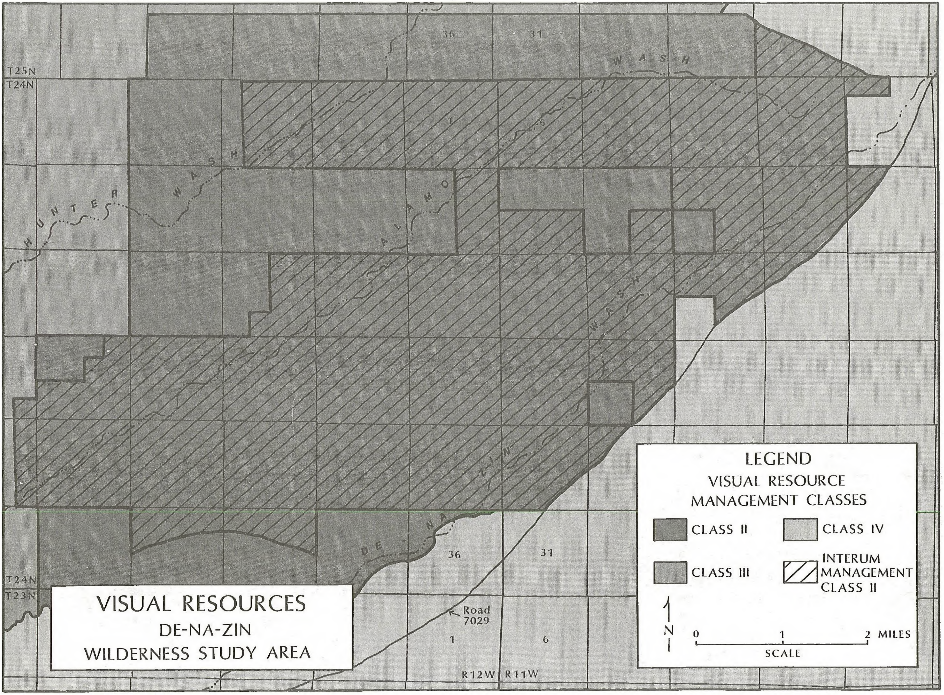
INTRUSIONS, WAYS & TRAILS
AH-SHI-SLE-PAH
WILDERNESS STUDY AREA

MAP I



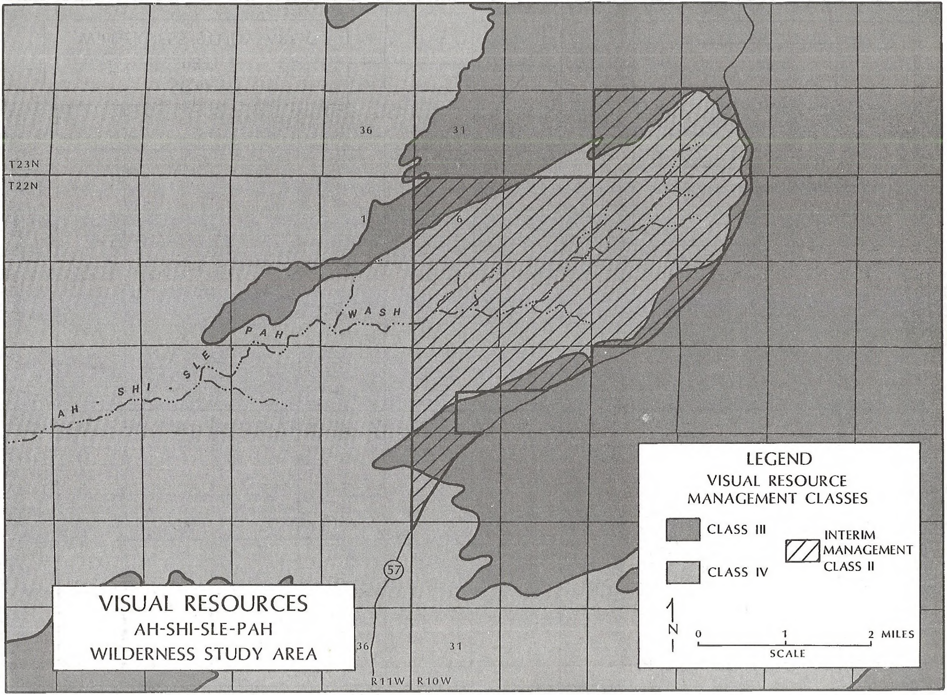
VISUAL RESOURCES
BISTI
WILDERNESS STUDY AREA

MAP J



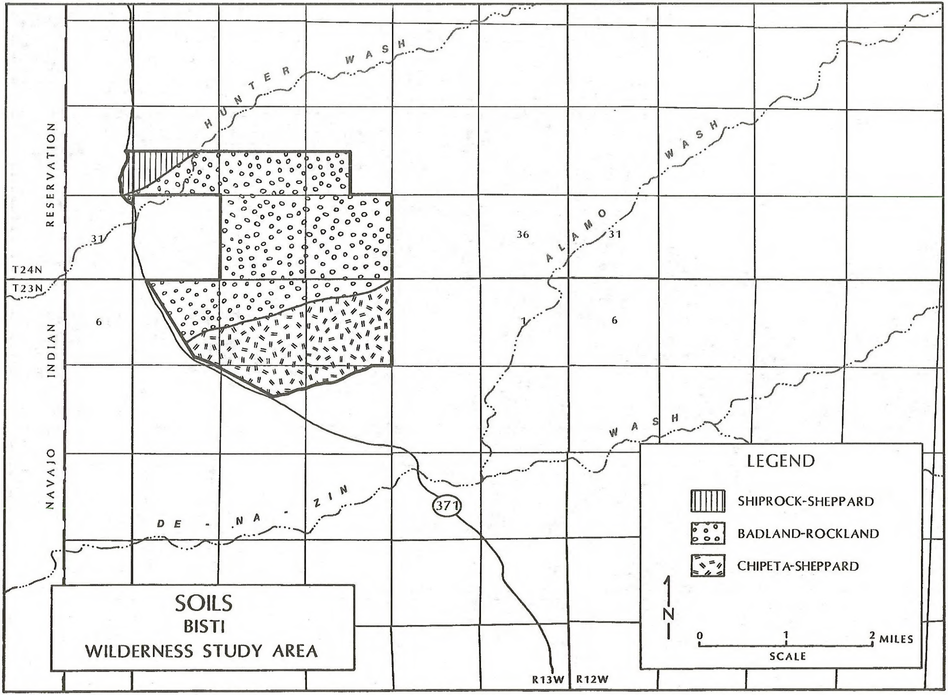
VISUAL RESOURCES
DE-NA-ZIN
WILDERNESS STUDY AREA

MAP K



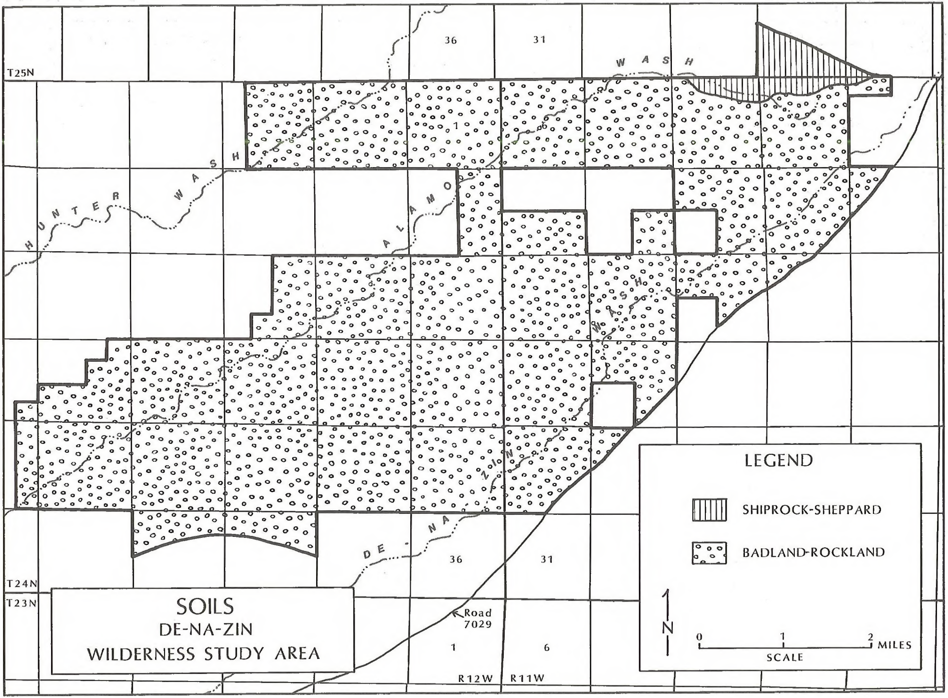
VISUAL RESOURCES
AH-SHI-SLE-PAH
WILDERNESS STUDY AREA

MAP L

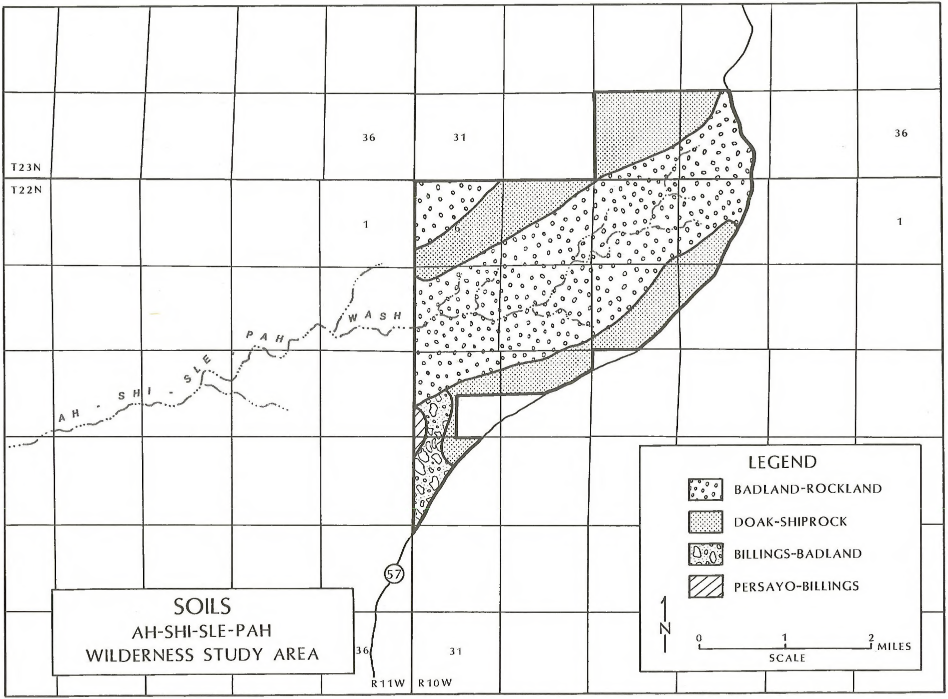


SOILS
BISTI
WILDERNESS STUDY AREA

MAP M

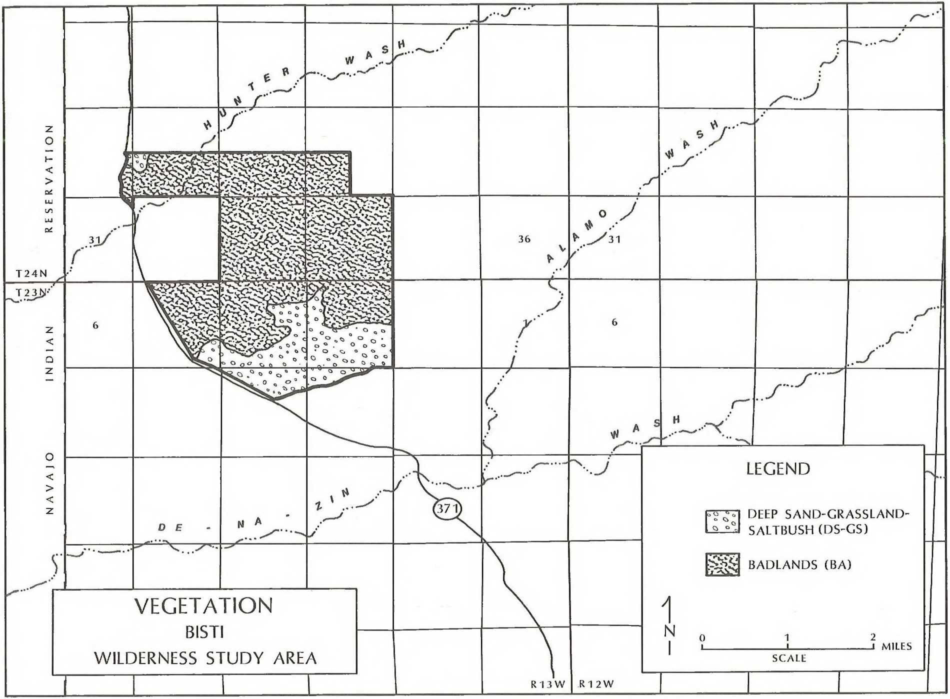

T25N
36
31
WASH
HUNTER WASH
ALAMO WASH
DE-NA-ZIN WASH
1
6
T24N
T23N
36
31
Road 7029
1
6
R12W
R11W
LEGEND
SHIPROCK-SHEPPARD
BADLAND-ROCKLAND
N
0
1
2
MILES
SCALE
SOILS
DE-NA-ZIN
WILDERNESS STUDY AREA

MAP N



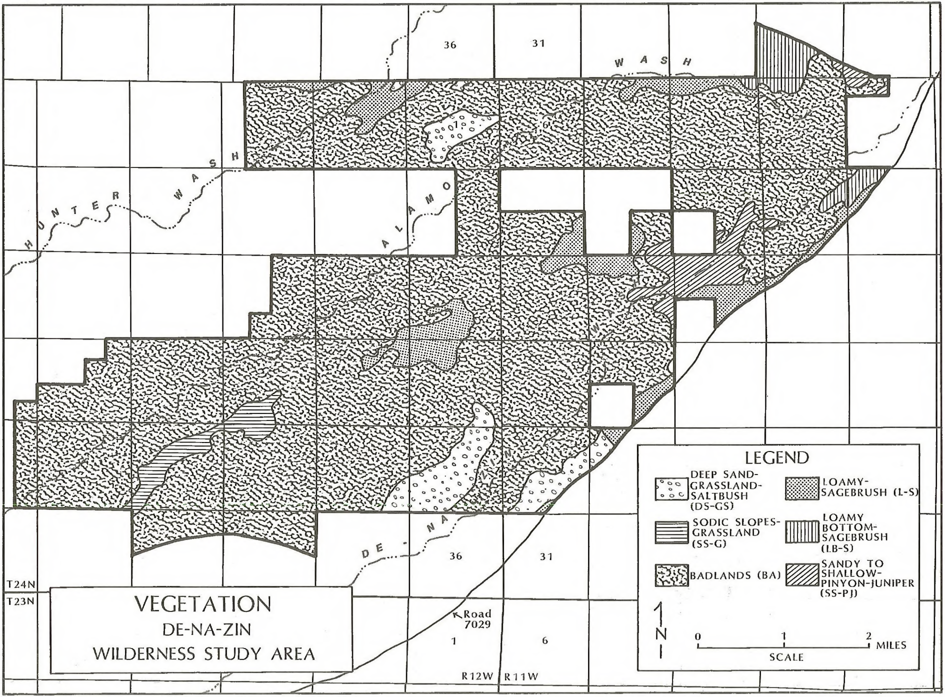
SOILS
AH-SHI-SLE-PAH
WILDERNESS STUDY AREA

MAP O

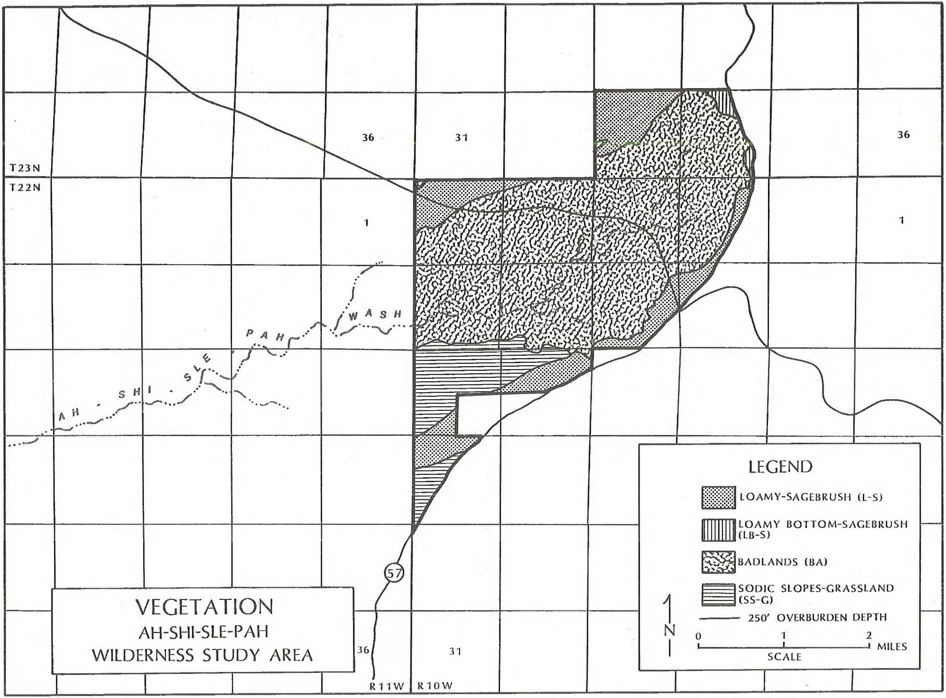


VEGETATION
BISTI
WILDERNESS STUDY AREA

MAP P

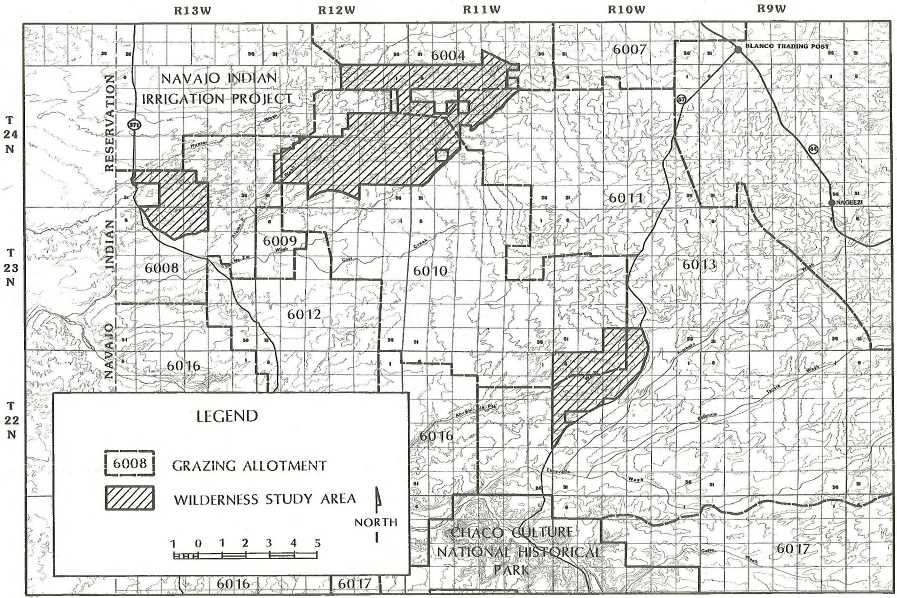

VEGETATION
DE-NA-ZIN
WILDERNESS STUDY AREA
LEGEND
DEEP SAND-GRASSLAND-SALTBUSH (DS-GS)
LOAMY-SAGEBRUSH (L-S)
SODIC SLOPES-GRASSLAND (SS-G)
LOAMY BOTTOM-SAGEBRUSH (LB-S)
BADLANDS (BA)
SANDY TO SHALLOW-PINYON-JUNIPER (SS-PJ)
N
0
1
2
MILES
SCALE
HUNTER WASH
ALAMO WASH
WASH
DE-NA-ZIN WASH
36
31
7
6
36
31
1
6
T24N
T23N
R12W
R11W
Road 7029

MAP Q

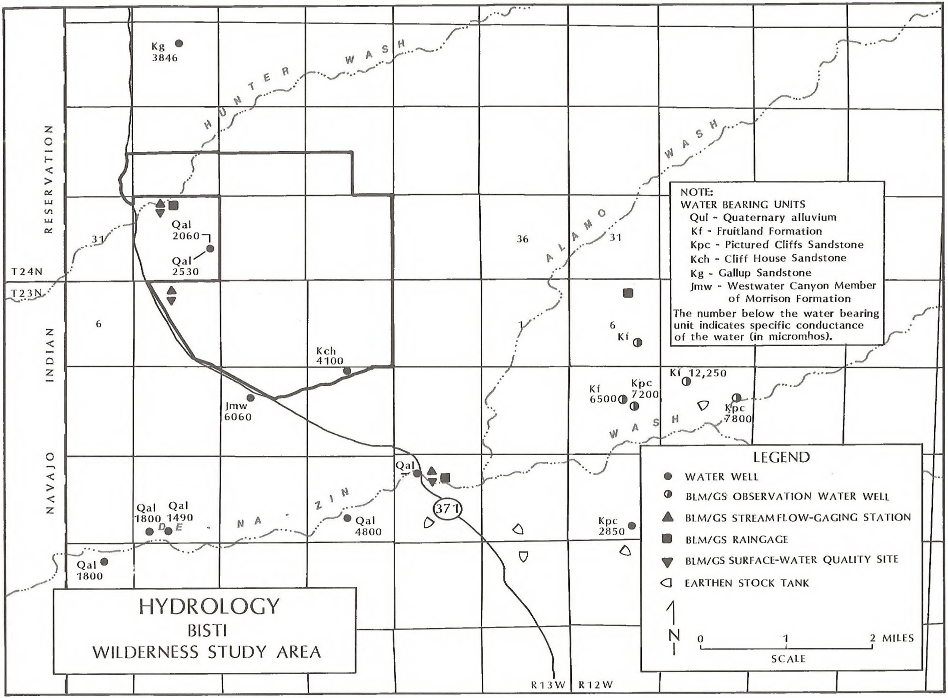


VEGETATION
AH-SHI-SLE-PAH WILDERNESS STUDY AREA

MAP R

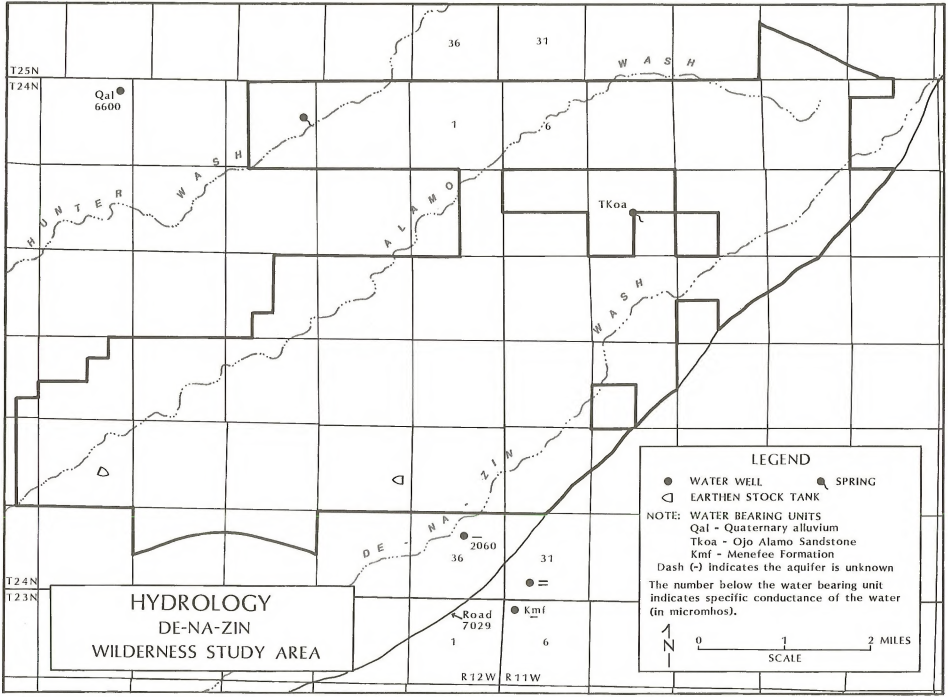

R13W
R12W
R11W
R10W
R9W
T 24 N
T 23 N
T 22 N
6004
6007
BLANCO TRADING POST
NAVAJO INDIAN
IRRIGATION PROJECT
NAVAJO INDIAN RESERVATION
371
57
44
Hunter
Wash
6011
NAGEEZI
6009
6008
6010
6013
6012
6016
6016
6016
6017
6017
Coal
Creek
Kimbeto
Wash
Tesite
Escavada
Ah-Shi-Sle-Pah
Gallo
Wash
CHACO CULTURE
NATIONAL HISTORICAL
PARK
LEGEND
6008 GRAZING ALLOTMENT
WILDERNESS STUDY AREA
NORTH
1 0 1 2 3 4 5

MAP S


Kg
3846
HUNTER WASH
ALAMO WASH
WASH
NA - ZIN
DE
RESERVATION
INDIAN
NAVAJO
31
36
31
6
6
1
T24N
T23N
Qal
2060
Qal
2530
Kch
4100
Jmw
6060
Qal
Qal
1800
Qal
1490
Qal
4800
Qal
1800
371
Kf
Kf 12,250
Kf
6500
Kpc
7200
Kpc
7800
Kpc
2850
R13W
R12W
NOTE:
WATER BEARING UNITS
Qul - Quaternary alluvium
Kf - Fruitland Formation
Kpc - Pictured Cliffs Sandstone
Kch - Cliff House Sandstone
Kg - Gallup Sandstone
Jmw - Westwater Canyon Member of Morrison Formation
The number below the water bearing unit indicates specific conductance of the water (in micromhos).
LEGEND
● WATER WELL
◐ BLM/GS OBSERVATION WATER WELL
▲ BLM/GS STREAMFLOW-GAGING STATION
■ BLM/GS RAINGAGE
▼ BLM/GS SURFACE-WATER QUALITY SITE
◁ EARTHEN STOCK TANK
N
0
1
2 MILES
SCALE

HYDROLOGY
BISTI
WILDERNESS STUDY AREA

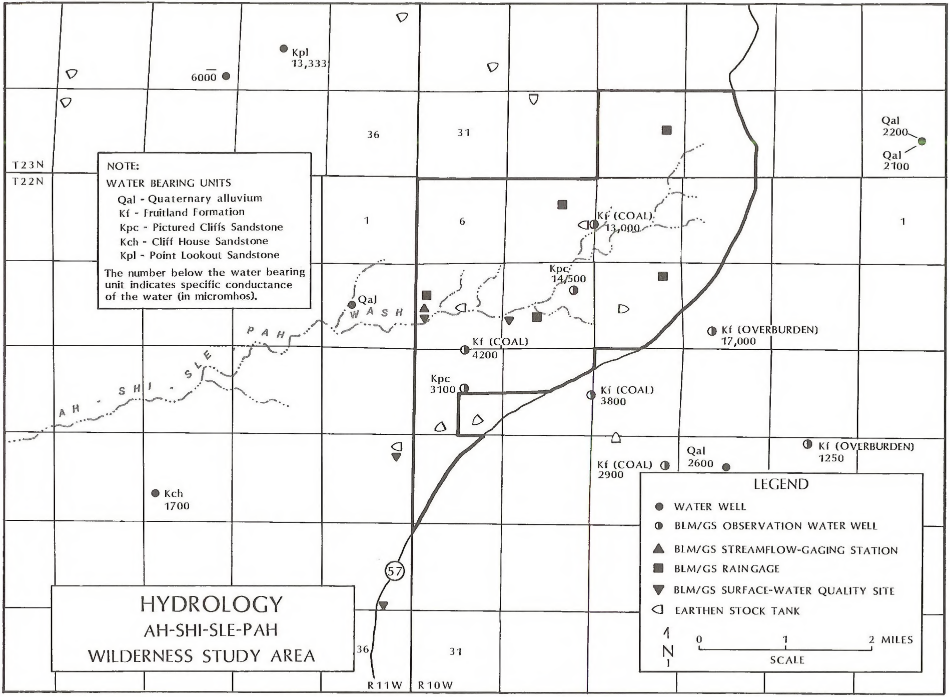
MAP T



HYDROLOGY
DE-NA-ZIN
WILDERNESS STUDY AREA

T25N
T24N
T24N
T23N
R12W
R11W
36
31
1
6
36
31
1
6
HUNTER WASH
ALAMO WASH
WASH
WASH
DE-NA-ZIN
Qal
6600
TKoa
2060
=
Kmf
Road
7029
LEGEND
WATER WELL
SPRING
EARTHEN STOCK TANK
NOTE: WATER BEARING UNITS
Qal - Quaternary alluvium
Tkoa - Ojo Alamo Sandstone
Kmf - Menefee Formation
Dash (-) indicates the aquifer is unknown
The number below the water bearing unit indicates specific conductance of the water (in micromhos).
N
0
1
2 MILES
SCALE

MAP U



HYDROLOGY
AH-SHI-SLE-PAH WILDERNESS STUDY AREA

MAP V

NOTE:

WATER BEARING UNITS

Qal - Quaternary alluvium
Kf - Fruitland Formation
Kpc - Pictured Cliffs Sandstone
Kch - Cliff House Sandstone
Kpl - Point Lookout Sandstone

The number below the water bearing unit indicates specific conductance of the water (in micromhos).

LEGEND

● WATER WELL
◐ BLM/GS OBSERVATION WATER WELL
▲ BLM/GS STREAMFLOW-GAGING STATION
■ BLM/GS RAINGAGE
▼ BLM/GS SURFACE-WATER QUALITY SITE
◁ EARTHEN STOCK TANK

APPENDICES

APPENDICES A, B AND C
BISTI, DE-NA-ZIN, AH-SHI-SLE-PAH WILDERNESS ANALYSIS REPORTS

Note: In these three appendices, all map citations refer to the maps located in Chapter 1 and the map section of the EIS. (Unless otherwise noted, the Bisti, De-na-zin, Ah-shi-sle-pah EIS is referred to as "the EIS".) Land use planning for each WSA and references for these three appendices are located at the end of Appendix C.

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LAND USE PLANNING RECOMMENDATIONS FOR THE BISTI, DE-NA-ZIN AND AH-SHI-SLE-PAH WILDERNESS STUDY AREAS C-8

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INTRODUCTION

Appendices A, B, and C contain Wilderness Analysis Reports (WARs) for the Albuquerque District's three Accelerated Wilderness Study Areas (WSAs): Bisti (NM-010-057), De-na-zin (NM-010-04), and Ah-shi-sle-pah (NM-010-09). The WSAs are located in the Chaco Planning Unit of the BLM Albuquerque District's Farmington Resource Area in northwest New Mexico (refer to Map A in Chapter 1 of the EIS).

The purpose of these WARs is to expand upon the wilderness suitability analysis that is contained in the Chaco Planning Unit Management Framework Plan (MFP; USDI, BLM 1981b).

Procedures for determining the suitability of an area for wilderness designation are found in the BLM Wilderness Study Policy (USDI, BLM 1981h). The final policy was not available until after the Chaco MFP analysis of wilderness suitability for the three WSAs was approved, so the MFP analysis was conducted using the draft Policy (USDI, BLM 1980a). However, these three WARs have been prepared using the final Wilderness Study Policy in order to maintain procedural consistency with other wilderness analyses being prepared within the State of New Mexico and the nation.

The land use planning recommendations for the Bisti, De-na-zin, and Ah-shi-sle-pah WSAs have been based on existing data and new information acquired after the September 1981 completion date of the Chaco MFP. These recommendations are the basis for the Proposed Action of the Bisti, De-na-zin, Ah-shi-sle-pah Proposed Areas Wilderness Environmental Impact Statement (EIS).

Impact analysis not covered in these WARs is covered in the text of the EIS, or will be covered in environmental analyses for other proposals.

APPENDIX A

BISTI WILDERNESS ANALYSIS REPORT

GENERAL DESCRIPTION

The Bisti Wilderness Study Area (WSA), which contains approximately 3,968 acres, is located in northwestern New Mexico, approximately 30 air miles south of Farmington and 15 miles northwest of the Chaco Culture National Historical Park. (Refer to Maps A, B, and D for the location, boundaries, and land status of the Bisti WSA. The following description of the WSA is taken from Bisti:The Badlands, a BLM public information brochure.)

The Bisti WSA is a remote, desolate area of upland rolling topography and badlands terrain. In the WSA are found two predominant geological formations, the Fruitland Formation and the Kirtland Shale. The Fruitland Formation makes up the majority of lands in the Bisti WSA, and consists of interbedded shales, sandstones, and coals with a siltstone base. Weathering of the sandstones has resulted in many mushroom-shaped formations throughout the WSA. The red coloration in the hills is a result of the shales being baked by high temperatures produced by the oxidation of the surrounding coals. The billowy mounds are the product of silts and clays that are rapidly eroding. The Kirtland Shale, which makes up the remaining portion of the badlands, contains shale that makes colorful caps on some of the land forms.

Examples of the prehistoric plant and animal life of the region can be found throughout the badlands in the form of petrified logs, fossilized dinosaur bones, and other plant and animal fossils. This paleontological record shows the shift from reptilian dominance to mammalian dominance.

Due in part to the soil composition and harsh environmental conditions, the badlands of the WSA support very little plant and animal diversity. The scattered vegetation includes greasewood, saltbush, cactus and a few grasses. The shortage of vegetation limits the number and type of animals living in the area, but some wildlife may be encountered. Species include birds of prey such as ferruginous hawks and golden eagles; mammals, including rabbits, coyotes, and small rodents, such as deer mice; and reptiles, such as snakes and lizards. (Refer to Chapter 2 of the EIS for more information on the wildlife and vegetation of the Bisti WSA.)

WILDERNESS CRITERIA

Criterion One--Evaluation of Wilderness Values

Component 1--Quality of Area's Mandatory Wilderness Characteristics

The basic wilderness characteristics of the Bisti WSA have been documented in the Star Lake-Bisti Coal Region, Accelerated Wilderness Intensive Inventory (USDI, BLM 1979b). The following discussion elaborates on the quality of these characteristics.

Naturalness. The Bisti WSA is sparsely impacted by the actions of man, and all existing intrusions are well-buffered by surrounding vegetation and/or topography. No single impact has an inordinate visual impact from a north, south, east, or west viewscape. The Bisti WSA appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable (USDI, BLM 1979b).

The accelerated intensive inventory identified Bisti's intrusions as 2 earthen dams, 1 windmill, 9 drill sites, scattered trash, and 5 routes.

Intrusion "a" (approximately one-quarter mile of fence, made of manufactured wood posts and wire, with a gate) was constructed after the accelerated inventory was completed. It was built by the BLM in the fall of 1979 to keep vehicular traffic from penetrating the WSA from Route 5. Intrusion "b" is a BLM/GS streamflow gaging station not identified during the inventory. Intrusions are plotted on Map G.

All intrusions are low impact, or of a reversible nature by hand tools (considering expected constraints of time, money and technology) or by natural processes. Because these intrusions have no significant impact on the overall naturalness of the Bisti WSA, there is no need to consider deleting any acreage from the potential wilderness to enhance naturalness. The disposition of these intrusions would be addressed in the Wilderness Management Plan following Congressional designation. Some intrusions may be required for continued use.

Outstanding Opportunities for Solitude. For designation as wilderness, the Bisti WSA will be required to possess either outstanding opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation.

Although the size of the Bisti WSA is less than 5,000 acres, the opportunity for solitude is not adversely affected. Additionally, the nature of the topography makes practicable the preservation and use of the Bisti WSA in an unimpaired condition. The northern three-quarters of the WSA is comprised of the Kirtland Shale and Fruitland Formation, which are exposed as badlands and characterized by highly rugged terrain. The topography of the majority of the WSA consists of a profusion of compact, rolling hills, broken by narrow washes filled with mushroom formations and spires. This varied, rugged topography inherently provides an excellent buffer between potential user groups (USDI, BLM 1979b).

The sparse vegetation in no way deters from this characteristic of solitude, but simply enhances it (USDI, BLM 1979b). The highly dissected topography of the badlands offers the user an outstanding opportunity to find a secluded spot in the thousands of enclosures or spaces. Both these factors compensate for the small size of the area.

The southwest quarter of the Bisti WSA consists of sandy, rolling grasslands. This terrain does not offer much screening between the user and activities outside the WSA.

At this time, the only noticeable outside sounds and sights are caused by coal trucks that travel Highway 371 between the De-na-zin Mine and the San Juan Generating Station (refer to Map A). When a user is in the western portion of the WSA, coal truck noises might be audible, and dust might be visible.

Extensive development is proposed on the acreage surrounding the WSA. Current information indicates that the proposed New Mexico Generating Station (NMGS) and associated activities would be partially visible from portions of the

Bisti WSA (Woodward-Clyde 1982a), and could increase the ambient noise levels in the WSA (Woodward-Clyde 1982b).

The western boundary of the WSA is contiguous with state land in T. 24 N., R. 13 W., Section 32. There is an existing coal lease on this land. Development of this lease may cause an increase in outside sights and sounds, which could affect solitude. The state's portion of Section 32 will be addressed later in conjunction with the manageability discussion.

The Bisti WSA currently possesses outstanding opportunities for solitude. These could be influenced by outside sights and sounds of future activities. Such impacts may be of short-term duration, and would not affect the long-term protection that wilderness designation provides for wilderness values.

Outstanding Opportunities for Primitive and Unconfined Recreation. Given the constraints of the Wilderness Act concerning motorized and mechanical transportation, "primitive and unconfined recreation" is defined by the BLM as "nonmotorized and non-developed types of recreation activities." The badlands nature of the Bisti WSA logically precludes the use of most motorized equipment, and its size and configuration lend themselves well to activities that do not require any facilities.

The rugged, broken badlands dominating the Bisti WSA provide an opportunity for an unusual type of primitive and unconfined recreation. Unique opportunities for hiking, horseback riding, photographic, and geological/paleontological sightseeing exist in the Bisti WSA (USDI, BLM 1979b). It is the rare nature of the badlands themselves that adds to the recreational opportunities in the northwest corner of New Mexico. People come from all over the region to see the Bisti Badlands, and they have received recent coverage through such nationally distributed magazines as Living Wilderness (Nothdurft 1981), Sunset (1981), and Frontier (Cheasebro 1980).

The Bisti WSA currently possesses outstanding oppoortunities for primitive and unconfined recreation, and is expected to continue to possess them regardless of what activities occur outside its boundaries. If opportunities for solitude are impacted by future development in the region, the continued recreation opportunities would be sufficient to meet wilderness study policy requirements for wilderness.

Component 2--Special Features

The Bisti WSA has special geologic, scientific, educational and scenic features.

The unique geologic values of the Bisti WSA,and thus its outstanding scenic quality, is the result of the erosion of soft, unconsolidated sediments into a variety of toadstool and spire formations. The southeast 1/4 of Sec. 33, T. 24 N., R. 13 W. is a particularly scenic area, and typical of the pockets of badlands relief found throughout much of the Bisti WSA. This area consists of three separate beds of hard, white to light tan sandstone which exhibit thin, hard, maroon concretionary sandstone capping vertical pinnacles of white sandstone. The WSA's overall appearance has been described as a moonscape (USDI, BLM 1979b).

The paleontological values of the Bisti Badlands have been discussed in the report written for the BLM by B. S. Kues (1977). The west side of the Bisti WSA contains some of the best samples of the lower part of the Kirtland Shale and the upper part of the Fruitland Formation (USDI, BLM 1979b; Robison 1982). It is in these formations that fossils of the Upper Cretaceous period (approximately 70 million years ago) are found. The formations contain "an almost unparalleled record of one of the most important episodes in the history of Life - the abrupt change from terrestrial communities dominated by dinosaurs to communities dominated by mammals." The Bisti Badlands have "long been recognized as having some of the best Late Cretaceous dinosaur and rare mammal fossils in the world...many new species of reptiles and mammals have been described from the area and additional new taxa were discovered during [the Kues] survey." Kues recommended that the Bisti Badlands be included in a preserve because "the combination of striking topography and surface deposits of large and impressive fossils make some of this area a logical place for a natural history park of some sort" (Kues 1977).

Although the Bisti WSA is important for the scientific contributions it can make, the eroded quality of the WSA makes it most valuable for the educational and scenic activities that are associated with the geological and paleontological features (Robison 1982). In view of its unique values and of the management commitment made for the protection of these values, the Bisti WSA is being nominated as a National Natural Landmark (USDI, BLM 1981b).

In addition, the Bisti WSA may contain archeological, burial, and sacred sites with intrinsic scientific, educational and heritage values.

Component 3--Multiple Resource Benefits

The Congressional, long-term protection offered by wilderness designation would provide reliable protection that is not readily subject to administrative change. This protection would cover wilderness values and recreation compatible with wilderness designation (primarily sightseeing and camping). The majority of the remaining resources would not be affected by wilderness designation, because the WSA is being given protection via such mechanisms as mineral withdrawal and nomination as a National Natural Landmark. (Refer to Chapter 3, Environmental Consequences, of the EIS text for a full discussion of the benefits that would be derived by designation of the Bisti WSA as wilderness.)

Component 4--Diversity in the National Wilderness Preservation System (NWPS)

Diversity in the NWPS will be considered in more detail in the Wilderness Study Report submitted to the Director of the BLM.

The region of the Bisti WSA, according to Robert G. Bailey (USDA, FS 1980), is classified under the Dry Domain in the Highland Province, and the Colorado Plateau subprovince. This area can be further subdivided into the Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic. A. W. Kuchler (1964) describes the two ecotypes found in the area as Grama-Galleta Steppe and Juniper-Pinyon

Woodland. A more site-specific discussion of the vegetation in the area is contained in Appendix C-1 of the Draft Environmental Assessment for Coal Preference Right Leasing (USDI, BLM 1981f). (These land classifications will be used to analyze the diversity of natural systems and features in the NWPS.

The Bailey and Kuchler vegetation classifications do not provide an accurate description of the Bisti WSA. When considering diversity in the NWPS it should be emphasized that the Bisti WSA is noted for its lack of vegetation and the resultant values found in the eroded topography.

One factor in diversity in the NWPS is the opportunity for solitude or primitive recreation near major population areas. The Bisti WSA is within one day's drive (5 hours) of Bernalillo County and part of Sandoval County, which have been identified in the 1980 census as being a Standard Metropolitan Statistical Area (SMSA--refer to the Glossary of the EIS; USDC, BC 1981).

Criterion Two--Manageability

Although the Bisti WSA covers less than 5,000 acres, it is considered manageable as wilderness. The badlands topography keeps the area from being physically intruded upon in any significant manner. This protects the characteristics of naturalness, opportunities for primitive and unconfined recreation, and special geological/scenic/scientific/educational features. The dissected topography also allows the visitor to maintain whatever level of isolation from outside sights, sounds, and other visitors that is desired, thus protecting the opportunity for solitude. Expected activities are not predicted to cause any management problems.

Wilderness designation must be appropriate to a WSA in light of expected uses and activities. Since the intent of designation would primarily be the protection of geologic processes, then the uses and corresponding management appropriate to the Bisti WSA are:

1. Recreation (hiking, horseback riding, photography and geological/paleontological sightseeing);
2. Research and study (cultural, water resources, paleontological) and;
3. Grazing and related facility maintenance.

Additional uses not commonly allowed in wilderness areas could be approved in some instances.

The following discussion addresses situations that may appear to offer manageability problems, but that are negated by the special management concern given to the Bisti WSA.

The federal government holds both surface and subsurface rights to the lands inside the WSA boundary. There are two coal leases overlapping the WSA (NM-0186612 and NM-0186613), both held by Sunbelt Mining Company. In response to public support for preserving the general region of the Bisti Badlands, Congress passed Public Law 96-475 which directs the Secretary of the Interior to exchange those overlapping portions for other federal coal. This is a non-discretionary action for the BLM (USDI, BLM 1981d).

Preference Right Lease Application (PRLA) NM-11916 overlaps the Bisti WSA by 320 acres. Under the authority of 43 CFR 3430.5-4 and 43 CFR 3461.1(d)(1), the Secretary of the Interior may initiate an exchange if lands are unsuitable for coal mining because of wilderness considerations (USDI, BLM 1981f).

There are oil and gas leases in the WSA, however there are no Known Geologic Structures (KGSs) there. (Refer to the Mineral Resources section of Chapter 2 of the EIS for a definition of a KGS.) There is no active exploration or development in the Bisti WSA and none is anticipated (USDI, BLM 1980b).

Numerous hardrock mining claims within the WSA are held by two parties who have apparently staked for the recovery of aluminum from the ash of proposed coal washing operations. The practice of staking lands leased for minerals to protect the lessee from nuisance claims is common (USDI, BLM 1980b). The claimants have an interest in the proposed New Mexico Generating Station, and have evidently staked the claims to protect proposed coal mining operations. When the existing coal lease and the PRLA overlap within the WSA are exchanged out for other federal coal lands, a relinquishment will be requested of the claimants. If the request is denied, the claims will have to be examined for validity.

Under interim management policy guidelines for lands under wilderness review, there are special rules for mining activities in WSAs smaller than 5,000 acres (USDI, BLM 1979b, Chapter I.A.5 and III.J.5.h). These rules would apply to development of any other additional locatable minerals. However, since the area is being withdrawn from further mineral entry (USDI, BLM 1981b), additional staking of valid claims is not anticipated.

In summary, although there are existing mining claims, coal leases and PRLAs within the Bisti WSA, exploration or development is not likely, and manageability of the WSA would not be impacted by mineral activity.

The Chaco MFP has recommended that the BLM attempt to acquire the state's portion of Sec. 32, T. 24 N., R. 13 W. if the Bisti WSA is designated wilderness (refer to the previous section; "Outstanding Opportunities for Solitude"). Acquisition would eliminate impacts to solitude from the proposed development of the existing coal lease, and could make the state's portion of this section available for consideration for inclusion in the wilderness area. Inclusion would increase the size of the Bisti wilderness area while proportionately decreasing the amount of boundary. The State of New Mexico has expressed an interest in considering this idea (Applegate 1982). The leaseholder, Sunbelt Mining, is postponing a statement of interest until their application for extension of their existing De-na-zin mine of the south to the Bisti WSA is processed (Millenbach 1982).

An option for improving the manageability of the Bisti WSA would be an adjustment of the western border to exclude the well-travelled Route 5 (refer to Map G), where traffic control could be difficult because a portion of the route passes through the state's portion of Section 32. This "cherry-stemming" or exclusion of the main vehicular way would eliminate any possible need to rehabilitate the route to wilderness standards, and would also provide a type of trailhead. Vehicle parking and visitor information could be provided at the end of the route (currently inside the WSA boundaries, but outside of them if the route were cherry-stemmed).

In summary, there are no known situations that would affect the ability of the BLM to manage the Bisti WSA in the long-term for anticipated uses. Manageability could be enhanced by acquisition of portions of Section 32, and inclusion of that area into the wilderness. This action would eliminate the need for cherry-stemming, because the entire route in question would be in the wilderness area, and therefore easier to control.

QUALITY STANDARDS FOR ANALYSIS AND DOCUMENTATION

Standard 1--Impacts of Wilderness Designation on Energy and Critical Mineral Resource Values

The U.S. Geological Survey and Bureau of Mines have initiated their mineral report on the Bisti, De-na-zin, and Ah-shi-sle-pah WSAs. Their findings are scheduled to be incorporated into the final EIS.

Coal, oil and gas, and certain locatable minerals have been discussed in the manageability section of this appendix. No minerals on the tentative list of the National Defense Stockpile Inventory of Strategic and Critical Materials are known to exist in more than trace amounts in the Bisti WSA (Laskar 1982).

Because no mineral development is expected to occur in the Bisti WSA, all existing mineral values would be preserved under wilderness designation. They could become available through Congressional action in case of a future critical minerals shortage.

Standard 2--Impacts of Wilderness Designation on Other Resources

Positive impacts on resources have been discussed in the "Multiple resource Benefits" section of this appendix. The adverse impacts of wilderness designation on other resources are summarized in the following paragraphs. More detail on the impacts of designation on other resources can be found in Table 1-2 and the text of Chapter 3, Environmental Consequences, of the EIS.

The following impacts would be expected from wilderness designation:

1. Grazing--there would be limitations on the construction of new facilities;
2. Off-road vehicle use would be restricted. Those areas where off-road vehicles are currently limited to ways and trails would be completely closed to traffic. The vehicle prohibition in the badlands area of the WSA would remain unchanged;
3. Soils and vegetation may be impacted by visitation; this in turn could affect some wildlife habitat; and
4. Limitations on excavation and removal of fossil material could occur.

None of the impacts of designation would reasonably affect the potential for further development of these resources.

Standard 3--Impacts of Nondesignation on Wilderness Values

Even if the Bisti was not designated as wilderness by Congress, the planning decision has been made to designate it as an Area of Critical Environmental Concern (ACEC; USDI, BLM 1981b). Anticipated impacts of ACEC designation on all resources, including wilderness values, is found in Table 1-2 and the text of Chapter 3 of the EIS. Additional information on ACEC designation and its impact on wilderness and other values, would be developed during ACEC management plan preparation.

The following impacts to wilderness values from non-designation could be expected:

1. Some wilderness preservation values may be lost (refer to Standard 5--Local Social and Economic Effects);
2. Off-road vehicle use and livestock grazing methods could affect naturalness, opportunities for primitive or unconfined recreation, or solitude; and
3. The WSA would be managed as an ACEC to protect the special geologic, scientific, educational and scenic features.

Standard 4--Public Comment

A full public involvement effort has been made during the wilderness inventory/WSA designation/Chaco MFP/EIS phases of the wilderness study process. Additional public participation will continue to occur in conjunction with the Wilderness EIS and the San Juan Basin Action Plan Cumulative Overview.

Public comment on the suitability of this WSA for wilderness designation has been extensive. The area received high public interest even before the wilderness inventory public participation effort was conducted in 1979. A relatively large number of people have written in support of preservation of this area, saying they had visited the comparatively remote area before forming their opinion. Interest in and visitation of this area has increased dramatically in the last few years, although no exact visitor use data is available. At nearly every public involvement opportunity provided during the inventory/WSA designation/MFP phases and the Wilderness EIS scoping, the public has generally spoken strongly in favor of preservation of this area.

The BLM has received a steady, if lesser stream of correspondence opposing wilderness preservation, primarily from energy mineral interests. Groups such as New Mexicans for Jobs and Energy have opposed wilderness designation chiefly on the grounds that national needs for energy override the need for wilderness, and that these areas are not unique or otherwise worthy of preservation. They claim that the area already shows too much human intrusion and that scenic, wildlife, paleontological and archeological values associated with the area are exaggerated.

Public comment has been documented and analyzed, and is included in part as Appendix I of the EIS. It is also available for review in the Albuquerque District Office and the Farmington Resource Area Office.

Standard 5--Local Social and Economic Effects

Identified social and economic effects of wilderness designation are discussed in the Wilderness EIS, Chapter 3, Social and Economic Factors section. A discussion of general or holistic values (conservation and educational values, and values to off-site users, including existence and option values) is contained in the socio-economic portion of the Chaco Planning Area Analysis (USDI, BLM 1981c). These values have not been quantified for this wilderness analysis report due to lack of data.

Standard 6--Consistency with Other Plans

Consultation and coordination have taken place with federal, state, local and tribal agencies through the public involvement process. Opportunities for further involvement will be available before the full wilderness study goes to the President and Congress.

No conflicts exist with the San Juan County land use plan. The San Juan County Commissioners have withdrawn their Recreation and Public Purpose application to preserve the Bisti Badlands as a park (Bash 1982; USDI, BLM 1980b).

APPENDIX B

DE-NA-ZIN WILDERNESS ANALYSIS REPORT

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APPENDIX B

DE-NA-ZIN WILDERNESS ANALYSIS REPORT

GENERAL DESCRIPTION

The De-na-zin Wilderness Study Area (WSA) is located in northwestern New Mexico, approximately 30 air miles south of Farmington and 16 miles northwest of Chaco Culture National Historical Park. The WSA covers approximately 19,922 acres of public land and has three inholdings (1,120 acres) of Navajo Indian allotment lands (refer to Maps A, B and E for location, boundaries and land status of this WSA.)

The De-na-zin WSA is composed of the Fruitland Formation and the Kirtland Shale, which consist of alternating layers of sandstone and gray, tan, and olive variegated shales (Kues 1977). The western section of the WSA, near the heads of Willow and Alamo Washes, is representative of the upper portions of the Fruitland Formation and the Kirtland Shale. This area is formed of flat-topped mesas capped by Ojo Alamo Sandstone. Alamo Mesa is located in the southwestern section of the WSA, skirted by rolling badlands and sparsely vegetated flats. The WSA is cut by Alamo and Willow Washes in the center and northern sections, and by De-na-zin Wash in the southern portion. These major washes and their tributaries wind among rugged badlands where green and gray siltstone and shale are exposed (USDI, BLM 1979b). (Refer to Chapter 2 of the EIS for a discussion of wildlife and vegetation in the WSA.)

WILDERNESS CRITERIA

Criterion One -- Evaluation of Wilderness Values

Component 1--Quality of Area's Mandatory Wilderness Characteristics

The basic wilderness characteristics existing in the De-na-zin WSA have been discussed earlier in the wilderness study process (USDI, BLM 1979b). The following dicussions emphasize the quality of these characteristics.

Naturalness. The intrusions identified in the De-na-zin WSA during the accelerated intensive inventory (USDI, BLM 1979b) include several drill holes, 1 earthen dam, 2 fencelines, a gate, and 15 routes (refer to Map H).

During the wilderness study analysis, two additional intrusions were discovered. Intrusion "a" is a Navajo occupancy consisting of an old route, a small modern house, one shed, one outhouse, one corral, and old cars. The occupancy covers a quarter section, and has been identified for the Navajo Land Exchange. This area could become Tribal land if the exchange is completed. The existing reasonable access would remain (see Routes 11 and 16) (USDI, BLM 1978).

Intrusion "b" is a small earthen dam for stock watering.

Two pipes on drill holes (Intrusion C) could be removed by hand tools. Removal of the Navajo occupancy would require more than hand tools. The remaining intrusions or routes could be closed and left to erode; no removal would be necessary. The disposition of these intrusions would be addressed in the wilderness management plan following designation. Some intrusions may be required for continued use.

Because of the De-na-zin WSA's large size (19,922 acres), these intrusions are hardly noticeable. Also the eroded, broken topography helps to screen them. Because these intrusions and routes are either minimally visible or invisible from viewpoints in the WSA, the imprints of man are substantially unnoticeable.

Outstanding Opportunities for Solitude. For designation as wilderness, the De-na-zin WSA will be required to possess either outstanding opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation.

While the occupied inholdings in the center of the De-na-zin WSA detract from the potential for solitude, the overall large size of the WSA enhances this potential.

The majority of the WSA is composed of rough badlands topography. This topography provides an excellent buffer between potential user groups. The vegetation is sparse in the badlands; the short grasses, shrubs, and few trees provide little vegetative screening. However, this lack of vegetation gives a feeling of spaciousness that is broken only by the terrain. The varied and rugged topography provides numerous niches and secluded spots that help provide an outstanding opportunity for solitude.

Extensive development is proposed outside the De-na-zin WSA. Outside sights and sounds are expected from surface facilities for the underground mining that may also extend beneath the WSA. Road 7029 on the WSA's eastern border would receive an increase in truck traffic if coal was mined, and possibly the road would be improved (refer to Map H). However because the topography rises slightly and then drops several hundred feet into numerous washes, none of Road 7029 and very few, if any, of the surface facilities would be visible. The rolling badlands along the De-na-zin WSA's southern border would provide less topographic screening from outside sights and sounds. Along a small portion of the western border, special lease stipulations regarding surface structures for underground mining would be applied and impacts from outside sights and sounds would be limited. Along the remaining western and northern boundary, mining would probably not occur because the U.S. Geological Survey (USGS) has not identified these areas as tracts for further consideration for leasing.

If the proposed New Mexico Generating Station is built, it would be visible in the higher elevations of the De-na-zin WSA (Woodward-Clyde 1982a).

The De-na-zin WSA currently possesses outstanding opportunities for solitude. This could be influenced by sights and sounds of future activities outside the WSA, or future activities inside the WSA. Such impacts may be of short-term duration, and would not affect the long-term protection that wilderness designation provides.

Outstanding Opportunities for Primitive and Unconfined Recreation. The opportunity for primitive and unconfined recreation is available throughout the majority of the De-na-zin WSA. The recreational potential is derived primarily from the unusual nature of the topography and the unique scenery. Hiking, horseback riding, and photographic opportunities are concentrated in the badlands in the southern two-thirds of the WSA. The major washes and tributaries offer a unique and intriguing visual experience. Sightseeing associated with the supplemental values of the WSA include geologic and paleontologic attractions. Petrified wood and a variety of other plant and animal fossils are abundant (USDI, BLM 1979b). The potential for seeing fossils while exploring the unique and beautiful scenery provides an outstanding opportunity for primitive and unconfined recreation.

This wilderness characteristic alone is sufficient to qualify the area for wilderness designation under Criterion One of the Wilderness Study Policy (USDI, BLM 1981h).

Component 2--Special Features

From a paleontological standpoint, the De-na-zin WSA is most important for its educational and scientific values. It contains the transition from the Fruitland Formation and Kirtland Shale, which were formed when dinosaurs were dominant, to the Ojo Alamo and Nacimiento Formations that were formed as mammals become dominant. This geological transition zone is one of the few places in the world where the final extinction of the dinosaur can be documented.

The De-na-zin WSA exhibits two community life forms, Coastal Plain and Inland Upland, which makes it extremely valuable from a paleontological standpoint.

The WSA contains great scenic diversity because of varied topography that includes sandstone bluffs, mesas, and badlands. The majority of the De-na-zin WSA consists of broken, rough badlands. The sandstone-capped bluffs and mesas intermingled with spires and mushroom formations give this WSA a scenic appeal distinctly its own. A wide variety of viewscapes is provided by mesa tops, intricately sculptured bluffs, and rolling, alluvial washes. The delicate coloration of these formations ranges from creams and tans to strikingly banded maroons and purples (USDI, BLM 1979b).

In addition, the De-na-zin WSA contains archeological sites that are representative of all or much of the range of archeological resources in the San Juan Basin. These sites have important scientific and educational values. The WSA may also contain burial sites and sacred sites with important heritage values to the Navajo Indian people.

Component 3 -- Multiple Resource Benefits

Congressional wilderness designation would provide reliable protection not readily subject to administrative change for wilderness values, for recreation compatible with wilderness designation, and for visual resources. (Refer to Chapter 3 of the EIS, Environmental Consequences for a full discussion of the benefits that would result from the designation of the De-na-zin WSA as wilderness).

Component 4--Diversity in the National Wilderness Preservation System (NWPS)

According to Bailey (USDA, FS 1980), the De-na-zin WSA is classified under the Dry Domain, High Province, Colorado Plateau; Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic. Kuchler (1964) describes it as Grama-Galleta Steppe and Juniper-Pinyon Woodland. A more site-specific discussion of the vegetation in the area is contained in Appendix C-1 of the Draft Environmental Assessment for Coal Preference Right Leasing (USDI, BLM 1981f). (These land classifications will be used to analyze the diversity of natural systems and features in the NWPS.

One factor in diversity is expanding the opportunities for solitude or primitive recreation near major population areas. The De-na-zin WSA is a five hour (one day) drive from the Albuquerque-Santa Fe area, which is identified as a Standard Metropolitan Statistical Area (SMSA--refer to the Glossary of the EIS) in the 1980 census (USDC, BC 1981).

Criterion Two - Manageability

Wilderness management must be appropriate to each WSA in view of expected uses and activities. Considering the fact that the intent of managing the De-na-zin WSA would be to allow geologic and ecologic processes to continue as in the past with a minimum of disturbance, then the uses and corresponding management appropriate to wilderness designation are:

1. Recreation (hiking, horseback riding, photography and geological/ paleontological sightseeing);
2. Research and study (archeological, water resources, paleontological);
3. Development and extraction work of mineral leases to mine deep coal;
4. Grazing and related facility maintenance; and
5. Development, extraction, and patenting of valid mining claims.

Complete Designation of the De-na-zin WSA

Included in the De-na-zin WSA are 1,120 acres of Indian allotment lands. (Refer to land status Map E.) The rights of access to these inholdings must be maintained. The Wilderness Act provides for the exercise of private rights for certain special uses that existed when an area was designated wilderness, even though these special uses are not necessarily consistent with preservation of wilderness character. This creates the potential for some impairment of an area's wilderness character, and can be acceptable under wilderness management (USDI, BLM 1981g). As mentioned above, the De-na-zin WSA also contains a 40-acre Navajo occupancy that is proposed for the Navajo Exchange. (Refer to Map H, Intrusion "a".)

Split estate (federal surface, state minerals) exists on 855 acres of the WSA (refer to Map E). No restrictions could be applied to the development of minerals on these areas. No locatable mineral mining claims occur on the De-na-zin WSA. Unless claims are located soon, little or no locatable mineral mining activity would take place if the De-na-zin WSA was designated as wilderness.

The coal under the Preference Right Lease Applications (PRLAs)in the De-na-zin WSA could be extracted by underground methods. Underground mining would not be allowed to impair wilderness qualities, but would have to be compatible with wilderness designation.

Sixteen pre-FLPMA oil and gas leases cover 4,545 acres of the De-na-zin WSA. Under wilderness designation, only the standard restriction could be placed on the development of these leases. This restriction states that the WSA will not be "unnecessarily or unduly degraded." Therefore, within this broad limitation, some wilderness qualities could be degraded by the development of these oil and gas leases.

Oil drilling that occurred in the De-na-zin WSA in the summer of 1981 (T. 24 N., R. 12 W., Section 23, NW 1/4) resulted in a dry hole. There is a potential for oil and gas as evidenced by the small Known Geologic Structure (KGS) inside the WSA and the large KGS to the north, outside the unit. An oil well in the De-na-zin WSA would have very limited production of a few barrels a day (Mason 1982). Such a well would be a marginal operation at today's prices. If oil prices rise, this area could become more financially attractive for development (San Filipo 1982). The potential for gas also exists; however, at this time this potential is only speculative. The USGS has said there was a well plugged in 1957. The pre-FLPMA oil and gas leases expire as follows:

	1983	1984	1985	1986
Number of Leases	1	7	6	1

Unless the economics for oil change by 1985 or 1986, little exploratory drilling would occur. One of the companies holding a pre-FLPMA lease is interested in drilling a 5,000 foot well for oil and gas in 1982 or 1983 (McHugh 1982). At that time it should be clearer whether the WSA could be manageable as wilderness in the future. At present the WSA would be manageable as wilderness because of the very limited oil and gas exploration. The WSA's large size would help keep oil and gas activity less noticeable.

Partial Designation of the De-na-zin WSA

A partial designation alternative has been developed for the De-na-zin WSA because of several existing and potential land status problems. This alternative includes 10,684 acres (refer to Map C in Chapter 1 of the EIS) located primarily in the south-central portion of the existing WSA.

This alternative would help to resolve problems of manageability in the northern portion of the WSA by excluding 1,120 acres of Navajo Indian inholdings, a 40-acre occupancy, and 855 acres of split estate minerals. Wilderness characteristics in this northern portion would be difficult to manage if more development occurs on these problem areas.

The southern portion of this WSA has been excluded from designation in this alternative because it has been tentatively selected by the Navajo Tribe under Public Law 93-531 (88 Stat. 172; 25 U.S.C. 640d) as amended by Public Law 96-305 (94 Stat. 929). This law, commonly referred to as the Navajo-Hopi Land Settlement Act, authorizes the Navajo Tribe to select 35,000 acres of public lands in New Mexico for transfer to the Tribe. The Navajo-Hopi Land Settlement Act pre-empts the Federal Land Policy and Management Act, under which the BLM entered the wilderness study process. Final selection of the southern portion of the WSA by the Navajo Tribe would automatically reduce the acreage in the WSA.

The area recommended for designation under this alternative has 18 pre-FLPMA oil and gas leases covering 3,786 acres. Because oil and gas development would be more noticeable in a wilderness area of smaller size, this center portion of the De-na-zin WSA would be manageable as wilderness if there is no intensive oil and gas development on the pre-FLPMA leases. Refer to the section, "Complete Designation of the De-na-zin WSA" (above) for more discussion of the mineral resources.

Enhancement of Manageability

Acquisition of inholdings in the De-na-zin under the complete designation alternative could be pursued to enhance the manageability of the De-na-zin WSA as recommended in the Chaco MFP (USDI, BLM 1981b) (refer to Map E). Access routes to the inholdings could be closed and allowed to revegetate naturally.

The occupancy in T. 24 N., R. 11 W., Section 7, SE1/4 could be identified as a part of the Navajo Exchange. If this quarter section was not exchanged, it would be subject to management under the wilderness regulations.

QUALITY STANDARDS FOR ANALYSIS AND DOCUMENTATION

Standard 1 - Energy and Critical Mineral Resource Values

The U.S. Geological Survey (USGS) and Bureau of Mines (BM) have initiated their minerals study on the three accelerated wilderness study areas in New Mexico. Their final report is scheduled to be incorporated into the final EIS.

The potential for coal, and oil and gas is discussed elsewhere in this appendix. No minerals on the tentative list of the National Defense Stockpile Inventory of Strategic and Critical Minerals are known to exist in the De-na-zin WSA in more than trace amounts (Laskar 1982). Under wilderness designation, development work, extraction and patenting would be allowed to continue after December 31, 1983 (or the date set by Congress) only on valid claims located on or before that date. No lease will be issued after designation or midnight of December 31, 1983 (refer to Table 1-1 of the EIS). Unleased or unclaimed minerals would be preserved by wilderness designation but could be made available through Congressional action in the event of a critical mineral shortage.

Coal

No coal in the WSA is identified as surface mineable. The following figures apply to the De-na-zin WSA:

Total mineable coal	400 million tons
Assume 35 percent recovery	140 million tons
Total value	$2.4 billion
Federal Royalty Value (FRV)	$192 million
FRV per acre	$10,000

Oil and Gas

According to the Chaco Unit Resource Analysis (USDI, BLM 1980b), the northern part of the De-na-zin WSA has high oil and gas potential. The oil and gas potential was discussed in the manageability section of this appendix.

Standard 2 -- Impacts on Other Resources

Positive impacts of wilderness designation on resources were discussed in the "Multiple Resource Benefits" section of this appendix. This section will summarize the adverse impacts of wilderness designation on other resources. More detail on the impacts of designation on other resources can be found in Table 1-2 and the text of Chapter 3, Environmental Consequences, of the EIS.

The following are expected to occur as a result of wilderness designation:

1. Some underground mineable coal resources would not be available for development;
2. Off-road vehicle use would be restricted;
3. Limitations on excavation and removal of fossil material could occur;
4. Underground mining could affect cultural resources; and
5. The occupancy structures would be subject to BLM wilderness management.

None of the impacts of designation would reasonably affect the potential for further development of the resources, except coal and the occupancy.

Mineral Management--Locatable Minerals

If an area was designated as wilderness, the mining laws would apply to the same extent as applicable prior to the designation of the area, or until midnight December 31, 1983 or the date set by Congress. Thereafter, subject to valid rights then existing, the lands would be withdrawn from all forms of appropriation under the mining laws (USDI, BLM 1981g).

Presently there are no mining claims on the De-na-zin WSA. Any mining claims located under interim management (WSA status) would be subject to valid existing rights if the WSA was designated wilderness later. Any new mining operations in a WSA or designated wilderness area would have an approved plan. The plan would ensure that the rights of the operator were protected while the impact on wilderness was minimized (USDI, BLM 1981g).

Mineral Management--Mineral Leasing

Oil and gas leases issued on public lands before the passage of FLPMA represent valid existing rights. These leases could be developed as long as the WSA was not unnecessarily or unduly degraded. Mineral leases could continue to be issued in wilderness areas until December 31, 1983 (or the date set by Congress). The BLM State Director could make a decision on whether or not to issue leases, permits, and licenses at any time in WSAs; or until December 31, 1983 or the date set by Congress in wilderness areas, subject to special wilderness stipulations. After December 31, 1983 or the date Congress sets, no mineral leases would be issued in designated in wilderness areas. Leases that were issued post-FLPMA would be allowed to be developed in accordance with the wilderness protection stipulation (USDI, BLM 1979a).

Standard 3 -- Impacts of Non-designation on Wilderness Values

If the De-na-zin WSA was not designated wilderness by Congress, it would be recommended for management as an Area of Critical Environmental Concern (ACEC). Anticipated impacts of ACEC designation on all resources, including wilderness values, is found in Table 1-2 and the text of Chapter 3 of the EIS.

Additional information on ACEC designation and its impact on wilderness and other values would be developed during preparation of an ACEC management plan.

The following impacts to wilderness values from non-designation could be expected:

1. Some wilderness preservation values may be lost (refer to Standard 5--Local Social and Economic Effects);
2. Off-road vehicle use, underground coal mining, possible mining for locatable minerals and livestock grazing methods could affect naturalness or opportunities for primitive or unconfined recreation, or solitude; and
3. The WSA would be managed as an ACEC to protect the special geologic, scientific, educational and scenic features.

Standard 4 - Public Comment

The type of comments and method of obtaining comments was the same as the type and method for the Bisti WSA. (Refer to the discussion in the Bisti WAR, Appendix A.)

Standard 5 - Local Social and Economic Effects

These effects would be similar to those on the Bisti WSA except for the impacts of coal mining. (Refer to the discussion in Appendix A.) Underground coal mining would be allowed in the De-na-zin WSA, however, stipulations to protect the wilderness resource could limit the amount of coal mined, because the stipulations would prohibit surface subsidence and occupancy. (Refer to Chapter 3, Social and Economic Factors section of the EIS for additional discussion.)

Standard 6 - Consistency with Other Plans

Refer to Bisti WAR, Appendix A, for a discussion of this standard. No conflicts exist between the BLM's Chaco Management Framework Plan and the San Juan County land use plan.

APPENDIX C

AH-SHI-SLE-PAH WILDERNESS ANALYSIS REPORT

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APPENDIX C

AH-SHI-SLE-PAH WILDERNESS ANALYSIS REPORT

GENERAL DESCRIPTION

The Ah-shi-sle-pah WSA, which contains approximately 6,563 acres, is located in northwest New Mexico approximately 3 miles north of the Chaco Culture National Historical Park. (Refer to Maps A, B, and F for the location, boundaries, and land status of the Ah-shi-sle-pah WSA.)

The geologic structure of the Ah-shi-sle-pah WSA consists of the Fruitland Formation and the Kirtland Shale, which contain alternating layers of sandstones and gray, tan and olive variegated shales (Kues, 1977). These soft, unconsolidated sediments have eroded into a variety of forms. Outcrops are exposed as badlands and characterized by highly rugged terrain, including spires, towers, and mushroom formations. The visual qualities of the Ah-shi-sle-pah WSA result from the broken, coarse terrain and coloration. Browns, tans and grays are highlighted by maroon and purple banding. The angular nature of the spires and mushroom shapes form an abrupt contrast with the rounded lines of rolling hills in the surrounding area.

The Ah-shi-sle-pah WSA contains geologic and paleontologic values that afford intrinsic educational opportunities. Fossil remnants of dinosaurs, crocodiles, fish, turtles, and early mammals, as well as petrified wood can be found in the WSA (USDI, BLM 1979b).

The majority of the unit is badlands, but the Ah-shi-sle-pah Wash in the center of the WSA provides rolling topography dissected by intermittent drainages. The southern portion of the WSA and a thin band along the eastern border are open and rolling, and support shortgrass and sagebrush vegetation.

Major wildlife species that may be encountered in this WSA include coyotes, upland game species such as scaled quail and mourning dove, snakes, lizards, turtles, and deer mice. Endangered bald eagles and peregine falcons may fly over the WSA. (Refer to Chapter 2 of the EIS for more information on wildlife and vegetation in the WSA.)

WILDERNESS CRITERIA

Criterion One--Evaluation of Wilderness Values

Component 1--Quality of Area's Mandatory Wilderness Characteristics

The basic wilderness characteristics of the Ah-shi-sle-pah WSA have been documented in the process of WSA designation (USDI, BLM 1979b). The following discussions emphasize the quality of these characteristics.

Naturalness. The BLM's 1979 wilderness inventory identified 1 dumping area, 2 earthen dams (1 with a fence), 2 raingages, 1 drill site, 2 fences, and 11 routes as intrusions in the Ah-shi-sle-pah WSA. The following intrusions, which are shown on Map I, were not included in the 1979 inventory report: 4 wells, 2 fencelines, 2 earthen dams, 3 raingages and 1 streamflow gage.

All intrusions are of low impact, or of a type reversible by natural processes or by hand tools (considering expected constraints of time, money and technology). All of them may be required for continued use. The recently identified intrusions may be permissible under wilderness management policy and the wilderness management plan for the Ah-shi-sle-pah WSA. The disposition of intrusions would be analyzed in the wilderness management plan following Congressional designation.

The Ah-shi-sle-pah WSA's intrusions are generally well-buffered by topography or vegetation. When viewed as a whole, the WSA appears to have been primarily affected by the forces of nature, with the imprint of man's intrusions substantially unnoticeable (USDI, BLM 1979b). Because these intrusions have no significant impact on the overall naturalness of the Ah-shi-sle-pah WSA, adjustments to the WSA boundary to enhance naturalness are not needed.

Outstanding Opportunities for Solitude. For designation as wilderness, the Ah-shi-sle-pah WSA is required to possess either outstanding opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation.

The Ah-shi-sle-pah WSA is a roughly triangular-shaped area approximately 6,563 acres in size. The majority of the WSA contains badlands formations, with rolling, intermittent washes. The highly rugged terrain provides an excellent opportunity for the user to find a spot secluded from other human sights and sounds (USDI, BLM 1979b). This opportunity is concentrated in the center of the WSA where the badlands occur (refer to Map O). The remainder of the WSA consists of rolling grasslands, which do not offer much screening between the user and activities outside the WSA, or between users inside the WSA. The vegetation of the WSA does not provide significant opportunities for seclusion but, rather, emphasizes the feeling of expansive solitude.

Sights and sounds outside the WSA boundary are primarily limited to traffic on State Road 57 (refer to Map F). However, extensive development is proposed for the acreage surrounding the WSA. The proposed New Mexico Generating Station (NMGS) and associated activities would be partially visible from portions of the Ah-shi-sle-pah WSA (Woodward-Clyde, 1982a), and would increase the ambient noise levels in the area (Woodward-Clyde, 1982b).

The Ah-shi-sle-pah WSA possesses outstanding opportunities for solitude that could be influenced by outside sights and sounds of future activities. Such impacts may be of short-term duration, and would not affect the long-term protection that wilderness designation provides.

Outstanding Opportunities for Primitive and Unconfined Recreation. Opportunities for primitive and unconfined recreation within the Ah-shi-sle-pah WSA are tied to its topography. The expansiveness of the rolling hills and the intricacy of the dissected badlands provide the WSA with varied opportunities for dispersed recreation. The badlands offer the opportunity for hiking, camping, horseback riding, sightseeing, and photography. The WSA is used primarily for day hiking, with some overnight use. Sightseeing opportunities related to the inherent scenic, geologic and paleontological values exist throughout the WSA.

These opportunities are expected to continue regardless of the activities that occur outside the boundaries of the WSA. This wilderness characteristic alone is sufficient to qualify the WSA for wilderness designation under Criterion One of the Wilderness Study Policy (USDI, BLM 1981h).

Component 2--Special Features

The Ah-shi-sle-pah WSA has special scenic, geologic, scientific, and educational features. The scenic values of the WSA are primarily derived from the badlands topography and coloration, which are the result of geologic processes. The rolling grassland portion of the WSA does not provide the same type of visual experience.

Because the WSA contains outcrops of the Fruitland Formation and Kirtland Shale, geologic and paleontologic values with intrinsic educational features exist. Scientific values are also tied to these paleontological values. The Ah-shi-sle-pah WSA contains roughly the same kind of paleontological resource as the Bisti WSA (refer to the Appendix A, "Special Features" section). The difference between the Bisti and Ah-shi-sle-pah WSAs is that more badlands acreage occurs in the Ah-shi-sle-pah WSA in which to find paleontological resources. The most complete dinosaur fossil remains found in the three WSAs were removed from the Ah-shi-sle-pah WSA, and some outstanding fields of petrified stumps occur there (Robison, 1982).

The Ah-shi-sle-pah WSA also contains archeological sites that have intrinsic scientific and educational values, and sacred sites with value to the Navajo Indian people.

Component 3--Multiple Resource Benefits

The Congressional long-term protection offered by wilderness designation would provide reliable protection not readily subject to administrative change. This protection would especially benefit wilderness values, recreation compatible with wilderness designation, visual resources, and cultural resources. The benefits to these resources would primarily occur because wilderness designation would preclude surface coal mining with its resultant disturbances. (Refer to Chapter 3, Environmental Consequences, of the EIS for a discussion of the benefits that would result from the designation of the Ah-shi-sle-pah WSA as wilderness.)

Component 4--Diversity in National Wilderness Preservation System (NWPS)

The Ah-shi-sle-pah WSA is classified by Bailey (USDA, FS 1980) as Dry Domain, Highland Province, Colorado Plateau: Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic. Kuchler (1964) classifies the area as Grama-Galleta Steppe and Juniper Pinyon Woodland. (These land classifications will be used to analyze the diversity of natural systems and features in the NWPS.) A more specific description of these vegetation sites is contained in Appendix C-1 of the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981f). The majority of the WSA is valued specifically for its lack of vegetation and the resultant values found in the eroded topography.

Expanding the opportunities for solitude or primitive recreation near major population centers is one facet of diversity in the NWPS. The Ah-shi-sle-pah WSA is within one day's drive (5 hours) of Bernalillo County and part of Sandoval County, which have been identified in the 1980 census as being a Standard Metropolitan Statistical Area (USDC, BC 1981--refer to the Glossary of the EIS).

Criterion Two--Manageability

Wilderness designation must be appropriate to the WSA in view of expected uses and activities. Because part of the intent of designating the Ah-shi-sle-pah WSA would be to allow geologic and ecologic processes to continue as in the past with a minimum of disturbance, the uses appropriate to wilderness designation are:

1. Recreation (hiking, horseback riding, photography and geological/ paleontological sightseeing);
2. Research and study (archeological, water resources, paleontological);
3. Grazing and related facility maintenance; and
4. Development, extraction, and patenting of valid mining claims.

Other uses not normally allowed under wilderness designation could occur on a case-by-case basis if approved by the BLM.

Surface and subsurface rights to the land inside the WSA boundaries are under BLM administration---there are no inholdings or occupancies. Approximately 358 post-FLPMA (Federal Land Policy and Management Act of 1976) mining claims exist within the Ah-shi-sle-pah WSA. The Wilderness Act recognizes the rights of mining claimants under the mining laws, and provides for prospecting until December 31, 1983 (or other date set by Congress). The Act also allows mining of valid claims in wilderness areas while still recognizing the wilderness resource. Exercise of the rights of mining claimants must be with the least possible impact on the wilderness resource (USDI, BLM 1981b). The WSA has low uranium productivity, and development is not expected.

Four post-FLPMA oil and gas leases exist in the WSA. The Ah-shi-sle-pah WSA has a fairly low productivity of oil and gas, and development of this resource is not expected.

Portions of three Preference Right Lease Applications are located within the WSA boundaries. Total PRLA application acreage, WSA acreage overlap, and percent of each PRLA overlapping the WSA (USDI, BLM 1981f) are presented below.

PRLA Number	PRLA Acreage	WSA Acreage Overlap	Percent of PRLA Overlapping WSA
NM-3918	4,477	985.04	22
NM-3919	4,478	3,156.24	70
NM-6804	1,602	1,214.12	76

Approximately 5,355 acres of federal coal mineable to the depth of 400 feet exist under the PRLAs on the Ah-shi-sle-pah WSA, amounting to approximately 320 million tons. The economic values (USDI, BLM 1981b) of this coal are shown below:

Total surface mineable coal	320 million tons
Assuming 85 percent recovery	270 million tons
Total value	$4.6 billion
Federal Royalty Value (FRV)	$580 million
FRV per acre	$96,000

Under wilderness designation, this coal would be unsuitable for mining because of 43 CFR 3461.1(d)(1) criteria, and could be exchanged under the authority of 43 CFR 3430.5-4.

In summary, no situations are known to exist that would affect the ability of the BLM to manage the Ah-shi-sle-pah WSA as wilderness with the anticipated uses for an indefinite period of time.

QUALITY STANDARDS FOR ANALYSIS AND DOCUMENTATION

Standard 1—Impacts of Wilderness Designation on Energy and Critical Mineral Resource Values

The U.S. Geological Survey/Bureau of Mines minerals report is scheduled to be incorporated into the Final EIS.

Coal, oil and gas, and certain locatable minerals have been discussed in the manageability section of this appendix. No minerals on the tentative list of the National Defense Stockpile Inventory of Strategic and Critical Materials are known to exist in the Ah-shi-sle-pah WSA in more than trace amounts (Laskar 1982).

Wilderness designation would preserve unleased and unclaimed minerals. They could be made available through Congressional action in case of a future critical minerals shortage (refer to Table 1-1 of the EIS).

Standard 2—Impacts of Wilderness Designation on Other Resources

The positive impacts of wilderness designation on the resources of the Ah-shi-sle-pah WSA were discussed in the "Multiple Resource Benefits" section of this appendix. This section summarizes the adverse impacts of wilderness designation on other resources. (More detail on the impacts of designation on other resources can be found in Table 1-2 and the text of Chapter 3 of the EIS).

The following impacts would be expected to occur as a result of wilderness designation.

1. Surface mineable coal resources would not be available for development;
2. Off-road vehicle use would be restricted;
3. Soils and vegetation may be impacted by visitation, which in turn could affect some wildlife habitat; and
4. Limitations on excavation and removal of fossil material could occur.

None of the impacts of designation would reasonably affect the potential for further development of the resources, except coal.

Standard 3—Impacts of Nondesignation on Wilderness Values

If the Ah-shi-sle-pah WSA was not designated as wilderness by Congress, it would be designated under no special protection (USDI, BLM 1981b). The anticipated impacts of No Special Designation on all resources, including wilderness values, can be found in Table 1-2 and the text of Chapter 3 of the EIS.

The following impacts to wilderness values from non-designation could be expected:

1. Some wilderness preservation values may be lost (refer to Standard 5--Local Social and Economic Effects);
2. Off-road vehicle use, surface coal mining, possible locatable mineral mining, and livestock grazing methods could affect opportunities for primitive or unconfined recreation, or for solitude; and
3. The WSA would be managed under No Special Designation. Geologic, scientific, educational and scenic features would be managed under standard BLM multiple use principles.

Standard 4—Public Comment

Public involvement for the Ah-shi-sle-pah WSA has been similar to that for the Bisti WSA. (Refer to Appendix A for a discussion of public comment.)

Standard 5—Local Social and Economic Effects

Refer to the Appendix A and Chapter 3 of the EIS for discussions of this standard.

Standard 6—Consistency with Other Plans

No conflicts exist between the BLM's Chaco Management Framework Plan and the San Juan County land use plan. Refer to the Appendix A for discussion of this standard.

LAND USE PLANNING RECOMMENDATIONS FOR THE BISTI, DE-NA-ZIN AND AH-SHI-SLE-PAH WILDERNESS STUDY AREAS

RECOMMENDATION

The September 1981 wilderness decisions of the Chaco Management Framework Plan, which remain unchanged by the Bisti, De-na-zin and Ah-shi-sle-pah Wilderness Analysis Reports, are as follows:

> Decision 1: From a land use planning perspective, consider the Bisti Wilderness Study Area and the De-na-zin Wilderness Study Area as suitable for wilderness designation, and the Ah-shi-sle-pah Wilderness Study Area as unsuitable for wilderness designation. Use these determinations as the basis for the Proposed Action in the Wilderness Environmental Impact Statement.
>
> Decision 2: Continue to manage the Bisti, De-na-zin and Ah-shi-sle-pah WSAs under Interim Management Guidelines, pending submission of the Wilderness Study to Congress, and Congressional designation to the Wilderness Preservation System or dismissal from consideration (USDI, BLM 1981b).

These land use planning recommendations are used as the Proposed Action in the EIS, and do not constitute the BLM's final wilderness recommendations.

RATIONALE

Bisti WSA

The Bisti WSA is being recommended through the BLM's land use planning process as suitable for wilderness designation. Congress has acknowledged the public's concern for the the Bisti region by enacting coal lease exchange legislation (P.L. 96-475). The BLM has supported protection by nominating the Bisti WSA to the Registry of National Natural Landmarks; making a commitment to the preservation of scenic values; initiating a minerals withdrawal; and recommending designation as an Area of Critical Environmental Concern (ACEC) if the WSA is not designated wilderness (USDI, BLM 1981b). Public sentiment is strongly behind wilderness designation for the Bisti WSA, and very few social, economic or resource impacts would occur from wilderness designation. Few differences exist between wilderness designation and ACEC designation except that Congressional (wilderness) designation would provide long-term protection less subject to periodic shifts in management philosophy. The Bisti WSA is manageable as wilderness and would add to diversity in the National Wilderness Preservation System.

De-na-zin WSA

The De-na-zin WSA is being recommended through the BLM's land use planning process as suitable for wilderness designation. This WSA contains outstanding opportunities for solitude, and for primitive and unconfined recreation. It also contains special features and has good characteristics of naturalness. Few social, economic or resource impacts would occur from wilderness designation. The coal resource could be developed with underground techniques. Although little oil and gas development has occurred to date, if leases were developed later, the large size of the WSA would offset the impacts.

The BLM has supported protection of this WSA by recommending designation as an Area of Critical Environmental Concern (USDI, BLM 1981b). Few differences exist between wilderness designation and ACEC designation except that Congressional (wilderness) designation would provide long-term protection less subject to periodic shifts in management philosophy. The De-na-zin WSA is manageable as wilderness and would add to diversity in the National Wilderness Preservation System.

The southern portion of the De-na-zin WSA has tentatively been selected by the Navajo Indian Tribe under the Navajo-Hopi Settlement Act. The northern portion of the WSA contains inholdings and split estate areas. An alternative to the Proposed Action in the EIS was developed because of these land status problems. This alternative (Alternative 1) suggests that only a part of the existing WSA be designated as wilderness. This part of the WSA would be manageable as wilderness if no significant oil and gas development occurs.

Ah-shi-sle-pah WSA

The Ah-shi-sle-pah WSA is being recommended through the BLM's land use planning process as unsuitable for wilderness designation. Although it contains outstanding opportunities for solitude, primitive and unconfined recreation, and special features, and has good characteristics of naturalness, the conflicts with other resource values offset the advantages of wilderness designation. The De-na-zin and Bisti WSAs do not have the coal resource conflicts that the Ah-shi-sle-pah WSA does, because the De-na-zin WSA's coal could be developed using underground techniques, and the Bisti WSA's coal would not be mined under any designation. The coal in the Ah-shi-sle-pah WSA is surface mineable, and the WSA is almost blanketed by Preference Right Lease Applications. In addition, the Ah-shi-sle-pah WSA duplicates many of the characteristics of solitude, recreation, naturalness and special features found in the other two WSAs. Wilderness designation of the Bisti and De-na-zin WSAs would not significantly affect other resource uses; however, designation of the Ah-shi-sle-pah WSA would result in significant impacts on mineral resources, while not providing diversity in the National Wilderness Preservation System beyond that offered by the Bisti and De-na-zin WSAs.

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APPENDIX D
MINERAL RESOURCES

APPENDIX D-1

United States Department of the Interior
MINERALS MANAGEMENT SERVICE
District Mining Office
P.O. Box 959
Farmington, New Mexico 87401

May 10, 1982

Memorandum

To: District Manager, Bureau of Land Management, Albuquerque, NM

From: District Mining Supervisor

Subject: Telephone conversation -- George Laskar De-na-zin Wilderness

The purpose of this memorandum is to document a telephone conversation between George Laskar, Ray Brady, and the author concerning the De-na-zin Wilderness and the mineability of coal within the area.

Some characteristics of the coal lands within the De-na-zin Wilderness area are:

(1) No surface mineable coal exists.
(2) All coal lies at a depth of 300 - 1500'; therefore, is underground mineable.
(3) Three PRLAs (western Associates Properties Corp.) exist.

At the present time, the coal within the wilderness area is considered commercially mineable. Indications are that private industry will invest and begin mining activities when the necessary markets are established and permits are obtained.

Billie E. Clark, Jt.

cc:
DMM, Mining

APPENDIX D-2

WSA LANDS UNDER LEASE FOR OIL AND GAS

Lease No.	Location
Bisti WSA	
NM-26832	T. 23 N., R. 13 W., Sec. 4, S^1/2; Sec. 5, SE^1/4.
NM-37759	T. 24 N., R. 13 W., Sec. 27, SW^1/4; Sec. 29, SW^1/4.
NM-37761	T. 24 N., R. 13 W., Sec. 33, All; Sec. 34, All.
De-na-zin WSA	
NM-13612	T. 24 N., R. 12 W., Sec. 23, All; Sec. 27, Lots 1-15.
NM-14443-A	T. 24 N., R. 11 W., Sec. 18, E^1/2W^1/2.
NM-16054	T. 24 N., R. 12 W., Sec. 13, Lots 11-14; Sec. 14, Lots 13 and 14.
NM-17015	T. 24 N., R. 11 W., Sec. 11, NW^1/4.
NM-19570	T. 24 N., R. 12 W., Sec. 22, All.
NM-20308	T. 24 N., R. 11 W., Sec. 17, N^1/2.
NM-20311	T. 24 N., R. 12 W., Sec. 20, Lots 1, 7 and 8; Sec. 21, Lots 9-12 and 14-16; Sec. 27, Lot 16.
NM-22595	T. 24 N., R. 12 W., Sec. 25, Lots 1, 8, 9, 15 and 16.
NM-23239	T. 24 N., R. 11 W., Sec. 17, NE^1/4.
NM-23241	T. 24 N., R. 12 W., Sec. 25, Lots 2 and 7.
NM-23471	T. 24 N., R. 11 W., Sec. 30, SE^1/4NW^1/4, Lots 3 and 4.
NM-24664	T. 24 N., R. 11 W., Sec. 3, All.
NM-25847	T. 24 N., R. 11 W., Sec. 29, NW^1/4.
NM-26660	T. 24 N., R. 11 W., Sec. 17, W^1/2SW^1/4; Sec. 30, SE^1/4.
NM-27023	T. 24 N., R. 11 W., Sec. 9, S^1/2SE^1/4.
NM-27437	T. 24 N., R. 12 W., Sec. 12, Lots 5-8.
NM-29344	T. 24 N., R. 11 W., Sec. 30, E^1/2SW^1/4.
NM-30020	T. 24 N., R. 11 W., Sec. 17, S^1/2SE^1/4.
NM-34602	T. 24 N., R. 11 W., Sec. 19, SE^1/4; Sec. 30 NE^1/4.
NM-34603	T. 24 N., R. 11 W., Sec. 19, NW^1/4. T. 24 N., R. 12 W., Sec. 15, Lots 9, 10, 14, 15 and 16.
NM-34604	T. 24 N., R. 12 W., Sec. 19, Lot 20.
NM-35569	T. 24 N., R. 12 W., Sec. 12, Lots 1 and 4; Sec. 20, Lots 9-16; Sec. 21, Lots 1-8.
NM-35892	T. 24 N., R. 11 W., Sec. 10, All; Sec. 15, N^1/2NW^1/4.
NM-36356	T. 24 N., R. 11 W., Sec. 4, All; Sec. 7, N^1/2SE^1/4, W^1/2SW^1/4; Sec. 8, SE^1/4; Sec. 9, N^1/2, N^1/2SE^1/4.
NM-36581	T. 24 N., R. 11 W., Sec. 15, S^1/2NW^1/4; Sec. 16, NW^1/4; Sec. 17, NE^1/4SW^1/4, N^1/2SE^1/4. T. 24 N., R. 12 W., Sec. 12, Lot 3.
NM-36584	T. 24 N., R. 12 W., Sec. 14, Lots 1, 2, 15 and 16; Sec. 24, All.

APPENDIX D-2 (Concluded)

Lease No.	Location
De-na-zin WSA (cont'd)	
NM-36953	T. 24 N., R. 11 W., Sec. 20, N^1/2, SE^1/4.
NM-38067	T. 24 N., R. 11 W., Sec. 18, E^1/2; Sec. 19, Lots 3 and 4, E^1/2SW^1/4; Sec. 30, Lots 1 and 2, NE^1/4, NW^1/4. T. 24 N., R. 12 W., Sec. 14, Lots 3-12; Sec. 15, Lots 1, 2, 7 and 8; Sec. 13, Lots 1-10, 15 and 16.
NM-39017	T. 24 N., R. 11 W., Sec. 2, Lots 3 and 4; Sec. 5, All; Sec. 6, All.
NM-43444	T. 24 N., R. 12 W., Sec. 12, Lot 2; Sec. 25, Lots 3-6, 10-14; Sec. 26, All; Sec. 28, All; Sec. 29, All.
NM-44467	T. 24 N., R. 12 W., Sec. 30, Lots 5, 12, 13 and 20; Sec. 33, Lots 1-8; Sec. 34, Lots 1-8.
Ah-shi-sle-pah WSA	
NM-15653	T. 22 N., R. 10 W., Sec. 3, Lots 3 and 4 S^1/2NW^1/4, SW^1/4; Sec. 4, Lots 1 and 2 S^1/2NE^1/4, SE^1/4; Sec. 8, NW^1/4, SE^1/4; Sec. 9, W^1/2.
NM-16051	T. 22 N., R. 10 W., Sec. 17, NE^1/4NE^1/4.
NM-16591	T. 22 N., R. 10 W., Sec. 8, E^1/2NE^1/4; Sec. 9, N^1/2NE^1/4, SW^1/4NE^1/4, SE^1/4; Sec. 10, NW^1/4.
NM-17013	T. 22 N., R. 10 W., Sec. 9, SE^1/4NE^1/4.
NM-19159	T. 22 N., R. 10 W., Sec. 17, NW^1/4, W^1/2NE^1/4.
NM-21460	T. 22 N., R. 10 W., Sec. 7, All.
NM-25839	T. 22 N., R. 10 W., Sec. 3, Lots 1 and 2 S^1/2NE^1/4.
NM-35882	T. 22 N., R. 10 W., Sec. 4, Lots 3 and 4 S^1/2NW^1/4, SW^1/4; Sec. 5, All; Sec. 6, All; Sec. 8, W^1/2NE^1/4.
NM-35883	T. 22 N., R. 10 W., Sec. 3, SE^1/4; Sec. 8, SW^1/4.

APPENDIX E
SOCIAL AND ECONOMIC FACTORS

APPENDIX E-1

CALCULATION OF VISITOR DAY VALUE

The $9.10 value per visitor-day referred to in the Social and Economic Factors sections of this EIS is a weighted average value. It was calculated by using: (1) activity occasion figures from the BLM's Chaco Planning Unit Planning Area Analysis (USDI, BLM 1981e), (2) visitor-day values from the Social Economic Profile, Northcentral Area, (USDI, BLM 1977), and (3) Washington Office Instruction Memorandum 76-455 (which specifies values for non-consumptive recreation use). (Activity occasion figures were used in place of visitor-days, though they are not exactly the same, because visitor-day figures are not available.) All values were indexed to 1981 by use of the Consumer Price Index. Recreation uses not compatible with wilderness designation or not likely to take place on the WSAs were excluded.

APPENDIX E-2

RESOURCES REVIEWED IN ANALYZING SOCIAL AND ECONOMIC IMPACTS

The following resources were considered in analyzing the impacts of the Proposed Action and the three alternatives on social and economic factors. These 13 resources were reviewed in terms of the way in which their management under each action (Proposed Action or alternative) would likely affect the social and economic conditions of the three WSAs.

I. Proposed Action
  A. Air Quality
  B. Cultural Resources
    1. Archeological site location
    2. Archeological site stabilization
    3. Archeological site interpretation
  C. Fire, Insect, and Disease Management
  D. Land Use
    1. Administrative structures and facilities
    2. Motorized and mechanical equipment
    3. Research and Studies
    4. Indian occupancy
    5. Indian gathering areas and sacred sites
  E. Minerals
    1. Coal
    2. Oil and gas
    3. Others
  F. Forest Products
    1. Timber
      a. Commercial
      b. Non-commercial
    2. Firewood
  G. Livestock Grazing
    1. Forage
    2. Livestock production
    3. Rancher investment
    4. Rancher costs
    5. Ranching lifestyle
  H. Water
    1. Quantity
      a. Surface
      b. Ground
    2. Quality
      a. Surface
      b. Ground
  I. Fish and Wildlife
    1. Recreation
      a. Needs
      b. Opportunities
    2. Science
      a. Needs
      b. Opportunities
  J. Recreation
    1. Sightseeing
    2. Camping
    3. Hiking
    4. Backpacking
    5. Hunting
    6. Fishing
    7. Rockhounding
    8. Photography
    9. Picnicing
  K. Visual Resources
  L. Paleontological Resources
  M. Wilderness Resources
    1. Recreation values
    2. Preservation values

II, III, and IV—No Action Alternative, Alternative 1, and Alternative 2 (Included the same subheadings as under the Proposed Action.)

APPENDIX F
CULTURAL RESOURCES

APPENDIX F

STATE OF NEW MEXICO
DEPARTMENT OF
FINANCE AND ADMINISTRATION
STATE PLANNING DIVISION

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DEPUTY DIRECTOR

February 12, 1982

Mr. L. Paul Applegate
District Manager
Albuquerque District
Bureau of Land Management
P. O. Box 6770
Albuquerque, New Mexico 87107

ATTN: Carol Thompson

RE: 8100.0 (015)
N-2

Dear Mr. Applegate:

This is in reply to your letter of January 28, 1982, in which you ask for my opinion on the National Register eligibility of the known sites within the Bisti, Ah-shi-sle-pah and De-Na-Zin Wilderness Study Areas (WSAs).

Of the 62 known sites within the 3 WSAs, I commented previously on 7, only one of which (NM-01-30853) I considered to be ineligible. I have reviewed the documentation you have recently provided on the other 55 sites. Five of these sites have two components, and 2 sites have three components, bringing the total number of components to 64. Of these, 48 are considered to be eligible for the National Register under criterion d only. The remaining 16 are not considered to be eligible. Site-by-site listings are given in the attachment.

It is my understanding that of the 3968.3 acres in the Bisti WSA, 1483.5 acres (37.4%) have been surveyed for cultural resources, and only one archaeological site found. The approximate site density would therefore be 1 site for every 1500 acres. Of the 6563 acres in the Ah-shi-sle-pah WSA, 480 acres (7.3%) have been surveyed. Nine sites were found, indicating an approximate site density of 1 site for every 53 acres. A similar site density is indicated for the

Mr. L. Paul Applegate
February 12, 1982
Page Two.

De-Na-Zin WSA (1 site for every 68 acres). (For De-Na-Zin, 3527 of the 19,923 acres (17.7%) have been surveyed and 52 sites were found.) While one might expect a lower site density for the Bisti WSA, this magnitude of difference suggests that sites were overlooked or for other reasons not included in the survey reports. This factor should be considered if the surveys within the Bisti WSA are going to be used for the purpose of managing cultural resources within this WSA.

Please feel free to contact the Bureau, if you have questions on any of the above.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Bureau

TWM:CJLB:jmg

Enclosure

ATTACHMENT

Sites/components considered eligible for the National Register under criterion d only:

De-Na-Zin Wilderness Study Area

NM-01-4149 *
NM-01-4150
NM-01-4155
NM-01-4156
NM-01-4157:
(prehistoric component)
NM-01-4158
NM-01-4159
NM-01-4161
NM-01-4162
NM-01-4163:
(both prehistoric components)
NM-01-4164
NM-01-4165
NM-01-4166
NM-01-4167
NM-01-4213

NM-01-4215
NM-01-4216
NM-01-4217
NM-01-4218:
(both components)
NM-01-4219:
(both components)
NM-01-4221:
(prehistoric component)
NM-01-4222
NM-01-4223
NM-01-4225
NM-01-4227:
(prehistoric component)
NM-01-4228

NM-01-4231
NM-01-4232
NM-01-4234
NM-01-4334
NM-01-4335
NM-01-4336
NM-01-4337
NM-01-4338
NM-01-4339
NM-01-4340
NM-01-4341
NM-01-4342
NM-01-4343
NM-01-4345:
(prehistoric and early Navajo components)

Ah-shi-sle-pah Wilderness Study Area

NM-01-30854
NM-01-30857
NM-01-30858

NM-01-30851 *
NM-01-30852 *
NM-01-30855 *

NM-01-30856 *
NM-01-30860 *

Bisti Wilderness Study Area

LA 5716

* from our previous consultation (7-24-81)

APPENDIX F (concluded)

Sites/components considered ineligible for the National Register

De-Na-Zin WSA

NM-01-4151

NM-01-4152

NM-01-4153

NM-01-4154

NM-01-4157:

(historic component)

NM-01-4160

NM-01-4163:

(historic component)

NM-01-4214

NM-01-4220

NM-01-4221:

(historic component)

NM-01-4224

NM-01-4226

NM-01-4227:

(historic component)

NM-01-4229

NM-01-4230

NM-01-4233

NM-01-4345:

(late Navajo component)

Ah-shi-sle-pah WSA

NM-01-30853 *

* from our previous consultation (7-24-81)

APPENDIX G
PALEONTOLOGY

DEFINITIONS FOR IMPORTANCE VALUES ASSIGNED TO FOSSIL OCCURRENCES (FROM KUES, ET AL., 1977)

Class I CRITICAL/MITIGATION OR PROTECTION ESSENTIAL

This class includes any locality containing fossils that, by their rarity or exceptionally good or complete preservation, will add considerably to knowledge of the paleobiology, morphology, stratigraphic or geographic distribution, or paleoenvironment of the fossil organisms. Such localities often contain a great abundance of ordinarily rare taxa, fossils new to science, parts of fossil organisms that have not been known previously and/or unusual or unique *in situ* assemblages of fossils. Mitigation of these sites is essential because of the great amount of new paleontological information they contain. Depending on the size and type of deposit, mitigation may include total protection, or salvage through large scale surface collecting, excavation or bulk sediment sampling for screening purposes; or salvage may be limited to a statistically valid sample of all forms present.

Class II HIGHLY IMPORTANT/MITIGATION STRONGLY RECOMMENDED

These are localities containing fossil materials that significantly extend our knowledge of the morphology, paleobiology, stratigraphic or geographic distribution, or paleoecology of a species or assemblage. Highly Important sites generally contain numerous surface deposits that suggest more extensive or important remains would be revealed by intensive collecting and excavation. In some cases, beautifully preserved single specimens, such as a complete dinosaur bone or turtle carapace would also be considered Highly Important. High surface concentrations of small fossils, such as fish scales, reptile teeth, or freshwater molluscs, which suggest that bulk screening would produce hundreds or thousands of additional specimens are likewise Highly Important. Mitigation is strongly recommended for these sites and would consist of salvage similar to that recommended for the Critical localities. In most cases valid statistical samples would probably suffice but for rare species as much material as possible should be collected.

Class III IMPORTANT/MITIGATION RECOMMENDED

Important localities contain fossil materials that are relatively plentiful, common near the locality and elsewhere, and provide useful information for stratigraphic, geographic or variability studies. Single well preserved skeletal parts that are known from other specimens but worthy of examination or display are also in this category. Mitigation would generally be limited to a statistically valid sample of the fossils at the locality; large scale excavation or screening would rarely be needed.

Class IV INSIGNIFICANT/MITIGATION OPTIONAL

These localities contain fossils that are very poorly preserved, fragmented or undiagnostic and that are common elsewhere. Such localities provide minimal new information and show no indication that additional collecting, excavation or screening would provide additional material of value. Mitigation is optional and would be limited to sites that are near more important deposits.

APPENDIX H
VEGETATION

APPENDIX H

DESCRIPTIONS OF VEGETATION SITES

Loamy Bottom-Sagebrush (LB-S)

This site occupies nearly level to gently sloping areas on wide upland valley bottoms. The site is occupied by plant communities dominated by big sagebrush and black greasewood.

The big sagebrush community is located on gentle slopes of upland valleys. Major plant species associated with big sagebrush include galleta, blue grama, bottlebrush squirreltail, sand dropseed, broom snakeweed, and winterfat. Less abundant species are Indian ricegrass, needle-and-thread, wild buckwheat, rabbitbrush species, and pricklypear cactus.

The black greasewood community is located in the valley bottoms associated with sodium affected soils. This community commonly contains an understory of alkali sacaton, galleta, and western wheatgrass.

Loamy-Sagebrush (L-S)

The Loamy-Sagebrush site occurs on areas that are level to moderately sloping (0 to 9 percent), with occasional swales.

The vegetation is typically a sagebrush-grassland. Big sagebrush dominates the overstory except in small areas containing alkaline soils where fourwing saltbush is the dominant. Other common shrubs on this site include rubber rabbitbrush, winterfat, pricklypear cactus, yucca and broom snakeweed. Grasses common to this site are blue grama, galleta, and bottlebrush squirreltail. Less frequently found grasses include sand dropseed, Indian ricegrass, red threeawn, and alkali sacaton. Russian thistle, scarlet globemallow, and wooly Indian-wheat are forbs commonly occurring on this site.

Sandy to Shallow-Pinyon-Juniper (SS-PJ)

This site is undulating to hilly on breaks, ridgecrests, and escarpments. The slopes range from moderate to steep (5 to 30 percent). Rock outcrops comprise less than 5 percent of the site. The overstory vegetation consists of scattered pinyon and juniper trees. The understory is a mixture of shrubs and grasses of which big sagebrush, rabbitbrush, Mormon-tea, galleta, blue grama, Indian ricegrass, and needle-and-thread are the major species. Less common species found on this site are antelope bitterbrush, serviceberry, fourwing saltbush, pale wolfberry, red threeawn, bottlebrush squirreltail, and spike muhly.

Badlands (BA)

The badlands site is characterized by rolling to very steep, nonstony, barren hills, breaks, canyons, and valleys where shale is exposed or lies close to the surface. The soils are high in clay content and are highly resistant to water infiltration.

The vegetation of this site is very sparse and generally restricted to flat areas along intermittent channels which dissect badland areas. Alkali sacaton and galleta comprise virtually all the grasses of this site. Shrubs found here are black greasewood, shadscale, mound saltbush, fourwing saltbush, broom snakeweed, rabbitbrush, and Mormon-tea. The principal forbs are Russian thistle, wild buckwheat, annual saltbush species, four-o'clock, and various composite species.

Deep Sand-Grassland-Saltbush (DS-GS)

The terrain of this site ranges from nearly level to gently sloping (0 to 8 percent) undulations.

The aspect of the vegetation is characterized by shrub species mixed with short and mid-grasses. Shrub species which are most common on deep sand upland areas are fourwing saltbush, pale wolfberry, Mormon-tea, and various species of cacti and rabbitbrush. Indian ricegrass, galleta, sand dropseed, giant dropseed, spike dropseed, spike muhly, red threeawn, and blue grama comprise the majority of the grasses. Forbs are common on the upland areas. These include penstemon, wild buckwheat, stickseed, spectaclepod, globemallow, dock, wirelettuce, cryptantha, phacelia, and milkvetch.

Shallow, sodium-affected soils of this site support a sparse stand of vegetation. Species common to these areas are fourwing saltbush, black greasewood, shadscale, mound saltbush, broom snakeweed, alkali sacaton, galleta, western wheatgrass, and wild buckwheat. After summer showers, stands of annuals develop on these areas. Common annual plants are Russian thistle, sixweeks grama, cocklebur, and various species of aster.

Sodic Slopes-Grassland (SS-G)

The sodic slopes-grassland site occupies level to gently sloping mesas and valleys. The general vegetation aspect is grassland-shrub. However, some separation of life form occurs in that shrubs tend to dominate on uplands while grasses dominate in swales. High levels of exchangeable sodium in the soils limits the density and productivity of the vegetation on this site.

The dominant species of grass varies with locale, but include alkali sacaton, galleta, Indian ricegrass, sand dropseed, bottlebrush squirreltail, needle-and-thread, and red threeawn. The common shrubs are black greasewood, fourwing saltbush, rabbitbrush, winterfat, broom snakeweed, shadscale, and mound saltbush.

Forbs and annual grasses become abundant following measurable precipitation. The species most common are Russian thistle, wild buckwheat, sixweeks grama, sixweeks fescue, fluffgrass, and cheatgrass.

On areas of this site that have been severely overgrazed, broom snakeweed has become the dominant species.

APPENDIX I
PUBLIC SCOPING MEETINGS

APPENDIX I

RESULTS OF BLM SCOPING MEETINGS ON THE BISTI, DE-NA-ZIN, AH-SHI-SLE-PAH WILDERNESS EIS

Introduction

The purpose of this appendix is to report the issues and concerns voiced by those members of the public who attended the scoping meetings on the BLM's Bisti, De-na-zin, Ah-shi-sle-pah Wilderness Environmental Impact Statement (EIS) in November of 1981. The BLM is proposing that Congress add the Bisti and De-na-zin Wilderness Study Areas (WSAs) to the National Wilderness Preservation System. The third WSA, Ah-shi-sle-pah, is proposed to be managed according to multiple use policy. The EIS is being written to analyze the site-specific impacts of implementing these proposals (or alternatives) on the resources on and adjacent to the WSAs. The scoping meetings were held to gather the public's input about the issues that they feel should be considered in the EIS.

These issues were raised in three meetings, the first of which was held in Farmington (Civic Center) at 7:00 p.m. on November 9. The second and third meetings were held (at the same hour) in Taos (Harwood Library) on November 12 and in Albuquerque (Convention Center) on November 13, respectively. Sign-in attendance at these meetings was 9 people in Farmington, 10 in Taos, and 38 in Albuquerque, for a total of 57.

Those at the meetings represented a variety of private industries, special interest groups, and government agencies. Numerous others also attended as private citizens. (Refer to the last pages of this appendix for the names of all attendees.)

Their concerns were as diverse as their affiliations. These specific concerns have been grouped analytically in 11 general categories in order to assess the main areas of interest. However, a great deal of overlap exists between the categories, and they are not meant to be absolute or mutually exclusive. The number in parentheses following each category heading reflects the number of times issues belonging to this category were raised. The categories are listed in decreasing order of these numbers.

We hope that this summary and analysis of public concerns, issues, and suggestions is a fair and accurate reflection of the interests expressed by attendees. The BLM is taking these comments into consideration and determining the extent to which each comment can be dealt with in the EIS. Some concerns voiced at the meetings involve broad social questions which, though related to the issues being analyzed in the EIS, cannot be adequately addressed within the narrower limits of the proposed action. Several of these broader issues are expected to be dealt with in other BLM documents, such as the EIS being prepared for coal leasing in the San Juan River Region, or the cumulative overview document that will analyze the impacts of several BLM actions in the San Juan Basin.

Impacts of Wilderness Designation on Other Resources (27)

The effects of designating the WSAs as wilderness (or other special types of management areas) on other resources should be assessed. Specifically these resources include:

- Coal mining (are the wilderness areas being established to stop mining?);
- Oil and gas production (especially in De-na-zin);
- Air quality;
- Cultural resources (including the nearby Chaco Culture National Historical Park);
- Industrial development;
- Livestock grazing;
- Paleontology;
- Recreation and tourism (perhaps visitor use should be compared with the BLM's nearby Angel Peak Recreation Site);
- Limited public access;
- Local inhabitants, including Native Americans (including the effects of relocation);
- Local economy (public infrastructure, services, jobs, taxes, revenues gained and lost, increased demands on local governments);
- Social value of visitation;
- Soils (including erosion);
- Wildlife (can the WSAs handle an influx of wildlife as the result of mining?).

If the WSAs are not designated as wilderness, other impacts may occur. In particular, the following should be analyzed:

- The loss of scientific and ecological data (with special attention to paleontological and cultural resources, desert microbiology). Certain areas should be set aside for study regardless of the type of management.
- The effect on local Native Americans.

Pre-Designation Wilderness Policy and Procedures (19)

- A more in-depth analysis of the resource values and tradeoffs on the Ah-shi-sle-pah WSA should be completed--it should have been done before the planning document was written.

- Why was the Ah-shi-sle-pah WSA recommended as nonsuitable for wilderness designation?

- The De-na-zin WSA should be deleted from wilderness consideration because of already existing mineral development and oil and gas potential.

- The Bisti WSA is not large enough to be managed as a wilderness area.

- More study is needed on the optimum size of a wilderness area, as well as the size of buffer needed around it.

- Is the acceleration of wilderness designation really necessary, considering the possibility that the areas being leased for coal may not be mined for several years?

- Between now and the time the WSAs are designated as wilderness, the area may be saturated with mineral development applications or other damaging activities, adversely affecting the areas' suitability for designation. Stringent control of these activities should be kept, with impact studies being conducted.

- How final is Congress' designation of the wilderness areas--can it be reversed by the Executive Branch of government?

- If the Navajos select a WSA in the Navajo-Hopi Land Settlement, are there plans to designate another area as wilderness instead? Or could there be a boundary adjustment?

- Perhaps the Bisti and other WSAs should be managed under another type of designation (e.g., as an ACEC, a national monument, or national natural landmark).

- Other areas with paleontology and cultural resources (but less valuable coal and other minerals) should be considered for wilderness designation.

Coal Mining and Its Impacts, Reclamation (19)

- Mining in other areas of the state and nation should be considered (areas without wilderness values).

- The impact of mining on watershed resources should be analyzed.

- The effects of the New Mexico Generating Station on the area should be considered (air and water quality, acid rain).

- The compatibility of coal mining with all types of recreation should be analyzed.

- The beneficial impacts of coal development should be identified-such as improved transportation, social services, health services, employment, education, economy, needed energy resources, public access, and paleontology research.

- State of the art, costs and feasibility of reclamation should be addressed, along with the costs/impacts if reclamation fails.

- The amount of land that is being disturbed by mining at any one time should be limited; mining and reclamation should be staggered.

- What are the reclamation standards for badlands?

- There is not enough water in the area for reclamation. Even with plenty of water, the destruction of the area's ecology during mining would prohibit reclamation.

- To increase wildlife habitat, the possibility of reclaiming mined areas near the WSAs with plant species similar to those in the WSAs should be addressed.

Post-Designation Wilderness Policy and Procedures (18)

- Management of such a fragile area should be discussed - how will it be protected? Is the BLM or the State of New Mexico capable of ensuring compliance with management guidelines?

- Will the BLM follow federal guidelines in viewing a wilderness area from the outside looking in and not from the inside looking out?

- Specifically, how will the following be handled once the WSAs are designated as wilderness areas:

    - Underground coal mining (De-na-zin)?
    - Campfires?
    - Number of visitors?
    - Oil and gas leases, mineral claims?
    - Indian occupancies?
    - Industrial development of all types?
    - Prescribed footpaths?
    - Designated camping areas?
    - Concession stands?
    - Access?
    - Fire danger (from the burning of coal)?

- Would Bisti and De-na-zin receive greater protection and less publicity if they were not designated as wilderness areas?

Need for a National/Regional/Statewide Perspective in Evaluating Various Resources and Impacts (14)

- Availability of other sources of coal should be analyzed in regional or national terms.

- The amount of coal under the WSAs should be evaluated in a national and regional perspective - is it really that valuable?

- The coal benefits may be regional, but the benefits of wilderness designation national.

- The local and national need for coal and electricity is being overemphasized.

- What do the Bisti and De-na-zin WSAs have that other badlands do not have? What makes them unique? Are there any other similar areas in the Wilderness Preservation System as it stands now?

- Where would the water for all the developments in the San Juan Basin come from?

- The water demand should be viewed in terms of the Colorado Basin.

- The WSAs are in close proximity to the Chaco Culture National Historical Park--do we really need to preserve all similar resources in the same area?

- Paleontology values should be addressed in comparison to paleontology resources found elsewhere on the planet.

Impacts of Other Resources on Wilderness (12)

- Will wilderness values be impaired by coal mining and other development adjacent to the WSAs?

- The effect of the State of New Mexico's land inholding on the Bisti WSA should be considered, given the state's plan to mine that area. Economic value or loss should be assessed.

- The impacts of the town associated with the New Mexico Generating Station on wilderness should be discussed, including the boom-bust cycle.

- How will paleontology activities in the area affect the WSAs?

- How will the Navajo-Hopi Resettlement Act affect the WSAs?

- How will the use of water for mining affect wilderness (re: wildlife supply, vegetation, ground water level)?

Economics (11)

- The value of all minerals under WSA lands should be included.

- How will the minerals that cannot be extracted economically be dealt with?

- The present market value of the coal under De-na-zin should be estimated. At what point would this De-na-zin coal become economical to mine?

- The economic value of the minerals under the WSAs is being overemphasized, in light of the state's budget surplus and other sources of federal revenue.

- The effect on the coal market, nationally and regionally, if the coal is removed from the market by wilderness designation should be assessed.

- The values of all resources (non-monetary) should be compared with the value of the coal.

- The impacts on other resources of diverting funds into wilderness should be analyzed.

- The economic value of the public's opportunity to visit wilderness areas should be assessed.

Other Data Needing to be Presented in the EIS (4)

- How many acres of badlands are there in northwestern New Mexico? How many of these acres are under federal control? How many acres of badlands overlie coal?

- Comparison of specific management of and impacts on resources under wilderness, ACEC, and multiple use designation is needed.

- What types of mineral claims exist on the WSAs?

- What are the other uses of the WSAs, if they are not designated as wilderness?

EIS Alternatives Suggested (3)

- The alternative of designating all three areas (Bisti, De-na-zin, and Ah-shi-sle-pah) should be analyzed.

- An alternative should be included in the EIS that considers designating Bisti and De-na-zin as one wilderness area.

- An alternative should be analyzed for less stringent management practices followed in the areas close to the perimeters of the WSAs.

General BLM Management Procedures/Policies (3)

- Is there a possibility that the BLM will consolidate scattered tracts of public land for easier management?

- There is not enough variety of people and groups on the San Juan Basin Action Plan Steering Committee and in the BLM decision-making process.

- A representative from the State of New Mexico should be included in the BLM's scoping meetings to answer questions about water resources.

ATTENDEES AT BLM SCOPING MEETINGS
WILDERNESS EIS

Farmington (Civic Center)
Monday, November 9, 1981 - 7:00 p.m.

Name	Address
Franklin Roberts	Farmington
Hank Pohlmann	Farmington
Oscar Jordan	Santa Fe
Carlos Gallegos	Santa Fe
Scott Sandlin	Farmington
I. K. Holliday	Farmington
J. E. Bircher	Farmington
Paul Adkins	Farmington (Checkerboard Comm.)
Vernon Moore	Fruitland

Taos (Harwood Library)
Thursday, November 11, 1981 - 7:00 p.m.

Name	Address	Representing
Judith Novotny	Albuquerque	PNM
Gary Schrodt	Taos	Taos Nature Society
Joe Kennedy	Taos	Las Palomas de Taos
Marta Chilton	Dixon	Dixon Community Forum
Rainbow Gibbs	Dixon	Dixon Community Forum
Irene Gilbert	Dixon	Dixon Community Forum
Hank Saxe	Taos	Committee on Coal
Cynthia Patterson	Taos	Committee on Coal
Erika Dew	Taos	American Citizens Together
Barry Keaveney	Taos	American Citizens Together

Albuquerque (Convention Center)
Friday, November 12, 1981 - 7:00 p.m.

Name	Address	Representing
R. D. Campbell	Albuquerque	- - - - - - - - - -
E. M. Barrett	Albuquerque	- - - - - - - - - -
Darwin D. Miller	Albuquerque	Audubon Society
Mr. & Mrs. Charles Jaynes	Albuquerque	- - - - - - - - - -
W. P. Robinson	Albuquerque	Southwest Research
R. B. Grove	Albuquerque	- - - - - - - - - -
Judith Novotny	Albuquerque	PNM
Lawrie Chisholm	Albuquerque	PNM
E. G. Kreischer	Albuquerque	NM Wildlife Federation
Sue Small	Albuquerque	- - - - - - - - - -
Mike Bodenchuh	NMSU, Las Cruces	NMDA

APPENDIX I (concluded)

Albuquerque (Convention Center)
Friday, November 12, 1981 - 7:00 p.m. (continued)

Name	Address	Representing
David Riccitiello	Gallup	M.A.C.O.G
Sonja Bolin	Gallup	- - - - - - - - - -
Tim Peterson	Albuquerque	The People
Evelyn Saucier	Cedar Crest	- - - - - - - - - -
Robert Jackson	Albuquerque	Sunbelt Mining
Robert E. Howard	Albuquerque	- - - - - - - - - -
John Tiwald	Albuquerque	- - - - - - - - - -
B. J. Barsook	Albuquerque	- - - - - - - - - -
David Wilmsen	Albuquerque	- - - - - - - - - -
Carol Wildman	Albuquerque	- - - - - - - - - -
Kinsten Carey	Albuquerque	- - - - - - - - - -
Wm. H. Doleman	Albuquerque	- - - - - - - - - -
Jack Kutz	Albuquerque	- - - - - - - - - -
Rick Wilmsen	Albuquerque	- - - - - - - - - -
Lilly Rendt	Albuquerque	- - - - - - - - - -
Heister Drum	Albuquerque	- - - - - - - - - -
Muller E. Francis	Albuquerque	- - - - - - - - - -
William Brown	Albuquerque	- - - - - - - - - -
Mary Ellen Muth	UNM, Albuquerque	- - - - - - - - - -
Mary Lawton	Albuquerque	- - - - - - - - - -
Judy Ricci	Albuquerque	- - - - - - - - - -
Adelaide Gordon	Albuquerque	- - - - - - - - - -
R. Mat McCallum	Santa Fe	- - - - - - - - - -
Juli Bratun	Albuquerque	- - - - - - - - - -
Pat Wainwright	Albuquerque	- - - - - - - - - -
Phillenore D. Howard	Albuquerque	- - - - - - - - - -
M. B. Leaf	Albuquerque	- - - - - - - - - -

Written comments were also submitted to the BLM by Americans for Rational Energy Alternatives, Inc. (at the Albuquerque meeting) and by Wexpro Company of Farmington (by mail). Concerns from these comments have been incorporated into this document.

GLOSSARY

GLOSSARY

ALLUVIAL AQUIFER. An aquifer that consists of stream-deposited, unconsolidated clay, silt, sand, and gravel.

ALLUVIAL CHANNEL. The central part of a streambed, in this instance formed on unconsolidated valley fill deposits.

ANASAZI. A cultural stage associated with the development of an agricultural economy (ca. A.D. 450-1350 in the central San Juan Basin). This stage encompasses Basketmaker Periods (characterized by basketry and pithouse villages) and Pueblo Periods (characterized by pottery and villages of solid masonry construction).

ANIMAL UNIT (AU). Considered to be one mature (1,000 lb.) cow or its equivalent based upon average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain the equivalent of one cow, one horse, two elk, three Barbary sheep, five domestic sheep, five goats, five deer, or ten antelope for one month.

AQUIFER. A rock unit that contains water and is permeable enough to transmit this water to wells and springs.

ARCHAIC. A cultural stage of mobile, small-game hunter/gatherers (ca. 5500 B.C.-A.D. 450 in the central San Juan Basin).

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect the area and prevent irreparable damage to important wilderness, cultural, recreational, paleontological, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

ARTESIAN CONDITIONS. Ground water that is under sufficient pressure (always greater than atmospheric) to rise above the top of the aquifer containing it. This ground water does not necessarily rise to or above the land surface. Artesian is synonymous with confined.

ARTIFACT. An object produced or shaped by human workmanship.

BEDROCK AQUIFER. An aquifer that consists of consolidated material.

BRITISH THERMAL UNIT (Btu). The heat needed to raise one pound of water 1° F. A Btu is equal to 252 calories.

CHACOAN OUTLIERS. More than 70 prehistoric pueblo communities connected by a system of roads and visual communication into a sophisticated socioeconomic complex centering on the Chaco Culture National Historical Park (ca. A.D. 828-1178).

COMPONENT. The assemblage of artifacts left by each of two or more cultural groups using a single site at different periods.

EPHEMERAL STREAM. A stream that flows only in response to a storm.

FLOODPLAIN. A strip of relatively flat alluvium that borders a stream and is subject to repeated flooding.

INTRUSION. Any feature created by man that is visible in the natural environment i.e., fences, earthen dams and stock tanks, windmills, gas and oil wells.

LENTICULAR. A body of ore or of rock thick in the middle and thin at the edges, similar to a double convex lens.

LITHIC INDETERMINATE. A site with stone artifacts lacking diagnostic criteria for association with a particular cultural stage.

NAVAJO. The largest Indian tribe in the United States. Entering the southwest ca. A.D. 1500 as nomadic hunter/gatherers, by A.D. 1696 the Navajo had turned to the herding/gardening economy practiced by many tribal members today.

OUTCROP, COAL CROP. That part of a geologic formation or structure that appears at the surface of the earth. An outcrop containing a coal bed can be referred to as a coal crop.

OVERBURDEN, INTERBURDEN. Barren rock material, usually unconsolidated, overlying a mineral deposit and which must be removed prior to mining.

PALEOINDIAN. A cultural stage of Ice Age big game hunters (ca. 10,000-5500 B.C. in the central San Juan Basin).

PERENNIAL STREAM. A stream that flows all year. Streamflow is sustained during dry periods by ground water discharge.

POTENTIAL (OIL AND GAS). A theoretical estimate of the existence (occurrence) of hydrocarbons in an area. This is a professional judgement generally based on a broad knowledge of the geology of the area and usually does not take into account production capabilities (which may vary).

PREFERENCE RIGHT LEASE APPLICATION (PRLA). A formal request made to the BLM for a non-competitive coal lease. PRLAs were issued by the Secretary of the Interior in the San Juan Basin between 1971 and 1973 to the holders of prospecting permits. These individuals or companies were required to demonstrate that, during the period of the permit, they had discovered commercial quantities of coal.

PRODUCTIVITY (OIL AND GAS). An actual measurement of the quantity of hydrocarbons which have been or could be produced from a geologic formation or formations in an area, using state-of-the-art recovery techniques.

RANK. A coal classification based on the degree of change in molecular structure of the coal, caused by great heat or pressure (metamorphism). There are four major ranks. The lowest rank, lignite, is the least metamorphosed while the highest rank, anthracite, is the most highly metamorphosed. Subbituminous is the rank just above lignite, with bituminous ranked above subbituminous. Ranking is determined by the number of Btu's in one pound of the coal being classified. The letter A, B, or C after a rank classification is subdivision within that rank.

RECREATIONAL LIVESTOCK. Horses, mules, or burros used for recreational purposes to transport people and/or their supplies.

SEAM. A thin layer or stratum of rock separating two distinctive layers of different composition.

SITE. A physical location utilized by human beings for a specific purpose. An archeological site is identified as having been used by humans in the past through the artifacts that remain.

STANDARD METROPOLITAN STATISTICAL AREAS (SMSA). A county containing at least one city of 50,000 inhabitants or more, plus as many adjacent counties as are metropolitan in character and are socially integrated with that central city or cities.

SURFACE EXPRESSION. The indication of a subsurface geologic feature on the earth's surface.

VISITOR-DAY. Twelve visitor-hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons. Visitor-days may occur either as recreation visitor-days or as non-recreation visitor-days.

VOLATILE. Changing readily to vapor.

WATER TABLE CONDITIONS. Ground water that is under atmospheric pressure. This ground water does not rise above the top of the aquifer containing it. (Water table is synonymous with unconfined.)

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